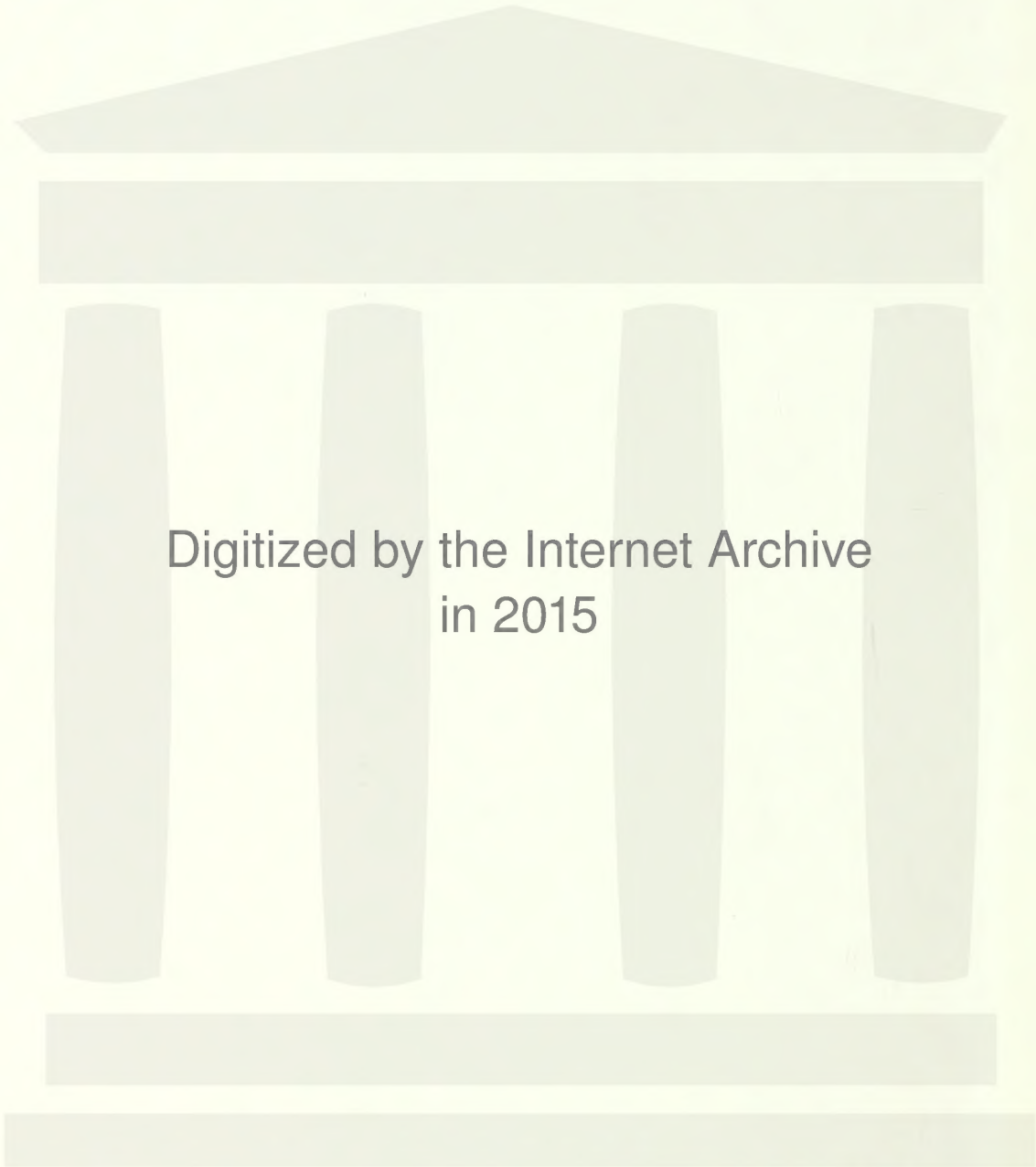
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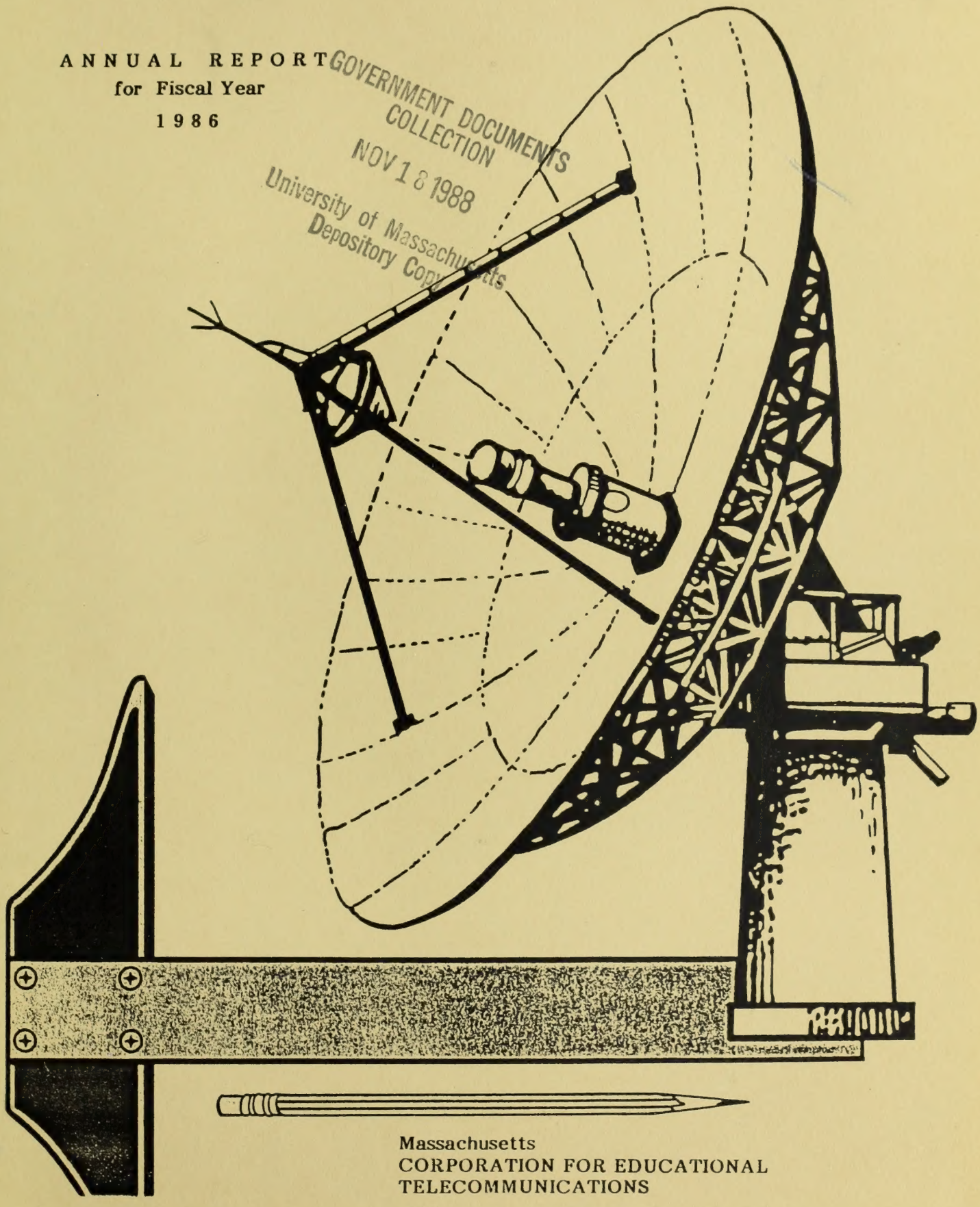
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ANNUAL REPORT

for Fiscal Year

1986

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Massachusetts
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TELECOMMUNICATIONS

CONTENTS

Third Annual Report

Appendices

A. Plan for Use of $300,000 Added to MCET FY 1986 Budget

B. Lincoln Filene Center for Citizenship & Public Affairs: An Assessment of the "Solutions Unlimited" and "Teaching Adults to Read Through Television" Teleconferences (Executive Summary)

C. Telecommunications for New England's Future: A Proposal for Educational and Economic Development

D. MCET Board of Directors (as of June 30, 1986)

E. Financial Statements and Accompanying Information, Years Ended June 30, 1986 and 1985, and Report of Certified Public Accountants

F. Minutes of the Meetings of the MCET Board of Directors

THIRD ANNUAL REPORT

For the Year Ending June 30, 1986

The Massachusetts Corporation for Educational Telecommunications (MCET) was created by Chapter 560 of the Acts of 1982. Section 6 of that statute requires that "The corporation annually shall submit a complete and detailed report of its activities within ninety days after the end of its fiscal year to the clerk of the house of representatives and to the clerk of the senate."

This Third Annual Report of the Massachusetts Corporation for Educational Telecommunications, for the year ending June 30, 1986, is filed pursuant to these requirements.

Primary Activities of Fiscal Year 1986

During Fiscal Year 1986 MCET was engaged in three primary activities:

1. The implementation of pilot projects utilizing existing transmission capacities. These projects were designed to demonstrate the benefits and costs associated with the delivery of educational and informational services via telecommunications, and to provide institutions with initial experience in the use of advanced communications technologies;

2. The development of a comprehensive proposal for a regional educational telecommunications network capable of serving all institutions of learning and businesses in the Commonwealth; and

3. The formulation of a plan for securing federal support for the construction of such a network as a national model for educational and economic development.

Background

The Massachusetts Corporation for Educational Telecommunications was created, according to Chapter 560 of the Acts of 1982, "to establish and operate a statewide telecommunications network to meet the educational and informational needs of business, industry, government, and the inhabitants of the commonwealth." In establishing MCET, the legislature recognized that existing telecommunications systems did not meet the state's needs, and that new state-supported facilities would need to be developed. The legislature contemplated a network serving all types of institutions -- educational, health care, government, and private businesses -- and reaching all parts of the state.

Throughout its first two fiscal years -- ending June 30, 1985 -- MCET developed studies and network planning documents supporting the development of the statewide network envisioned in Chapter 560. By the end of FY 85, however, MCET received indications that state funding for this major network would not be readily forthcoming. The Corporation, therefore, broadened its activities during FY 86, to seek other sources of funds for network development, while at the same time organizing and executing pilot projects that would test the need, on a small scale, for the types of telecommunications services that the MCET network would ultimately make available to all institutitions.

It was MCET's intent to focus on the initial development of a telecommunications network in Fiscal Year 1986 by:

- Securing the use of existing telecommunications capacities;

- Seeking donated transmission facilities (including a satellite transmitter to be based at the University of Massachusetts in Amherst); and by

- Creating efficient new connections (or "bridges") between these facilities and capacities.

Such a plan (to use existing capacities) was motivated by financial realities rather than good network design judgement; dependence on existing capacities has severe drawbacks, including the fact that:

- Little such capacity is available;

- The availability of transmission time is dictated by the capacity owners' own schedules and interests (which are sometimes threatened by the development of a statewide network); and

- Such existing capacities cannot reach major portions of the state.

The Corporation believed, however, that this configuration of existing and new transmission facilities would provide a wide range of institutions with an opportunity to begin testing the delivery of educational services and information via telecommunications. MCET intended, therefore, to expend a significant portion of its $677,000 FY 1986 budget on leasing capacity and developing new connections between the leased systems and contributed facilities.

The Executive Office of Administration and Finance disapproved the development of new telecommunications facilities at this time, however, and released only $377,000 of the approved budget. After lengthy discussions and the presentation by MCET of a detailed plan for the expenditure of the money on pilot projects (see Appendix A), Administration and Finance released an additional $30,500 with the stipulation that these funds be expended only on the use of existing telecommunications capacities to test the marketability of telecommunications services in the Commonwealth.

Pilot Project Development

Despite the constraints preventing MCET from developing efficient links connecting a wide variety of existing telecommunications capacities, the Corporation in FY 1986 was able to develop and begin implementation of a comprehensive series of pilot projects designed to determine:

- Whether the delivery of educational services via telecommunications on a pilot project basis meets institutional goals;
- Whether it is economically and technically feasible to utilize teleocmmunications for the delivery of such services on a permanent basis;
- Whether institutions and/or target audiences will pay for the delivery of educational services via telecommunications; and
- Whether the state's educational and economic climate will be enhanced by the availability of an educational telecommunications system.

In short, the pilot projects seek to determine whether the benefits of an educational telecommunications network justify the cost of establishing, maintaining and operating such a network.

As a part of pilot project planning, MCET undertook an extensive outreach program, contacting those institutions that had participated in MCET's "Assessment of Telecommunications Uses and Needs" completed in FY 85, as well as those institutions that had expressed interest to MCET in experimenting with telecommunications services over the past two years.

Bureau of Educational Resources Projects

In October 1985 the Department of Education's Bureau of Educational Resources (BER) proposed a joint project with MCET to test the feasibility of electronically transmitting instructional software to

schools throughout Massachusetts. Currently, instructional software is distributed to each school system by mail. Initial consultation with MCET resulted in the design, implementation and evaluation of a two-part pilot project to:

1. Test the use of a television signal's vertical blanking interval (vbi) as a means of distributing instructional computer software from a central facility to multiple school receiver-sites; and

2. Test the effectiveness of teleconferencing for teacher training and networking. Specifically, MCET and BER would conduct a teleconference among teachers at selected school sites to discuss the use and integration of instructional computer software in the classroom.

In April 1986 MCET and BER, in cooperation with the WGBH Educational Foundation, tested an encoding and decoding system for the transmission of software via the "vbi." An initial test of vbi transmissions over WGBH-TV in April 1986 revealed problems with vbi transmissions using currently existing communication software for Apple IIe computers. The project was postponed until the fall of 1986, when new software could be developed or IBMs could be substituted for Apple IIe computers.

On May 21, 1986, middle school teachers in Boston, Dracut, Greenfield and Chicopee participated in a one-hour, interactive workshop. Panelists at Bunker Hill Community College's TV studio led a discussion on the use of "Solutions Unlimited," a middle school curriculum that uses videotape and computer diskettes to teach problem solving skills. Teachers at remote sites viewed the presentation through a temporary network of existing TV capacities integrated by MCET; participants were able to comment and ask questions through an audioconferencing system. The teleconference

demonstrated an effective method of teacher training and networking, according to an independent evaluation conducted by the Lincoln Filene Center for Citizenship and Public Affairs, under a contract with MCET (see Appendix B).

Board of Library Commissioners

On June 9, 1986, MCET implemented a teleconference sponsored by the Massachusetts Board of Library Commissioners (BLC) entitled, "Using Television to Teach Adults to Read." The teleconference originated at the Roxbury studios of the Boston cable television system and reached an audience of adult literacy educators, researchers and librarians at remote locations in Boston, Holden, South Hadley and Somerville. Participants viewed the live discussions and accompanying videotape presentations, and interacted with conference discussion leaders at the origination site through an audioconferencing system.

The two hour teleconference sought to gather information on the use of television for adult literacy training. The BLC plans to fund the production of a video-based instructional series aimed at adults with zero through fourth grade level reading skills. This pilot project was also independently evaluated by the Lincoln Filene Center for Citizenship and Public Affairs at Tufts University (Appendix B).

Future Projects

Late in FY 86 MCET began working with a number of additional organizations and institutions towards the development and implementation of pilot projects for implementation during FY 87. Projects planned for autumn 1986 include:

-- A live professional education course originating at an institution of higher learning and televised to local educators at school sites throughout the state;

-- A series of video workshops for small industries focusing on new methods of quality control; and

-- A series of courses for health care professionals at local hospitals emanating from a major teaching hospital.

Other Demonstration Projects

In addition to formal pilot projects, MCET undertook several additional projects demonstrating teleconferencing uses.

In October 1985 MCET coordinated the transmission of a lecture from the Kennedy School of Government at Harvard University to a television studio in Springfield, where western Massachusetts educational, political and business leaders could see the program and call in questions.

Also in October, MCET organized the live transmission of a Ford Hall Forum lecture on World Hunger to two sites in Springfield (Springfield College and the Continental Cablevision studios), with an audio return capability.

On June 25, 1986, MCET joined with the Talking Information Center (TIC) of Marshfield, the Massachusetts Commission for the Blind and the Western Massachusetts Radio Reading Service of Springfield in hosting the Eighth Anniversary observance of TIC radio at a State House ceremony and teleconference. Nearly 10,000 listeners subscribe to the Talking Information Center and its affiliates statewide. Special receivers permit blind and print-handicapped individuals to pick up the daily readings of newspapers, magazines, books and shopping guides that are broadcast on a special sideband of FM radio stations.

For the anniversary celebration, MCET provided the necessary equipment and audioconferencing capacity to link the State House to the Talking Information Center in Marshfield and to the Western Massachusetts Radio Service in Springfield for the live transmission of a three hour program for the blind and visually handicapped. The audioconference featured remarks and the reading of news by a number of community leaders, including Governor Dukakis, Cardinal Law and Senate President Bulger.

Network Development

From its earliest studies, MCET has recognized that a genuinely beneficial telecommunications network must be a fully integrated system capable of reaching all parts of the state regardless of geographical location or topographical characteristics. It has recognized, too, that such a system would operate most efficiently if it served the entire region, rather than simply the Commonwealth. MCET was heartened, therefore, during the early months of FY 1986, by strong indications of Congressional interest in encouraging the use of advanced telecommunications technology for improving instructional quality and increasing the pool of trained workers for industry on a regional basis.

In September 1985, MCET's Board of Directors voted to accept a grant of $1.25 million from the Board of Trustees of Boston University for the development of an educational telecommunications network as envisioned by the Legislature in Chapter 560 of the Acts of 1982. The MCET Board also voted to use the Boston University grant to retain under a thirty month contract the Washington-based consulting firm of Cassidy & Associates, which has successfully assisted a number of Masachusetts institutions in obtaining federal support for major development projects. (Among these projects are the Polymer

Center at UMass/Amherst, the Tufts University Nutrition Center, the Tufts Medical School Library, the Science and Engineering Center at Boston University and the Thomas P. O'Neil Library at Boston College.)

In the months following this Board action, MCET (in consultation with Boston University, the University of Massachusetts, and Cassidy & Associates) developed a comprehensive plan for a state-of-the-art telecommunications network, to be owned an operated by MCET, and two Technology Resource Centers, to be located at and operated by Boston University and UMass/Amherst respectively and tied into the MCET network. MCET staff supplemented its previous year's needs assessment by conducting in-depth interviews with public school representatives. As described in the proposal (see Appendix C), the network is designed to demonstrate how creative use of advanced telecommunications technologies can:

1. Improve educational opportunities for students in primary and secondary schools, particularly in the crucial areas of math, science, and foreign languages. It would do this by offering courses not currently available to students, and by providing continuing professional development programs for primary and secondary school teachers.

2. Promote economic development by providing accessible, high quality continuing education for the labor force.

3. Facilitate the sharing of information among and between the private and public sectors, and among educational institutions at all levels, through interactive data exchange and teleconferencing.

4. Facilitate the efficient and cost-effective use of scarce educational resources.

The model telecommunications network would use satellite and microwave transmission systems to link primary and secondary schools, colleges, universities, hospitals, and business and industrial worksites. It would be capable of addressable, two-way interactive television, voice and data communication, and would be easily expandable to meet future increased demand within the state and throughout New England.

The Technology Resource Centers (TRCs), operating as an integral part of the network, would help educational institutions and private enterprises make effective use of the transmission capacity provided by the MCET network. The TRCs would work with client institutions and individuals to develop, evaluate, and distribute television programming and computer software, and would provide network users with access to academic and industrial experts in instructional technology, computer science, television production and other disciplines.

On April 30, 1986, MCET Board Chairman David Knapp, along with Vice-Chairman Richard Snyder, Boston University President John Silber, UMass/Amherst Chancellor Joseph Duffey and Executive Director Richard Borten travelled to Washington, D.C. to meet with Senator Kennedy and Congressmen Atkins, Markey, Moakley and Conte. All of the meetings were successful, with each legislator expressing support for the MCET proposal. Indeed, within a week of that visit, Congressman Atkins had successfully amended a foreign trade bill, which then passed the House of Representatives, to authorize the Secretary of Education to fund a non-profit state corporation such as MCET.

Other Activities of the Fiscal Year

Negotiations for Telecommunications Capacity

Pending development of its own integrated telecommunications network, MCET has provided transmission services by leasing and temporarily connecting existing capacities as needed. In order to ensure access to major transmission links, the Corporation has entered into contracts for the use of capacity with a number of owners.

After lengthy negotiations for use of the House of Representatives and WGBH Inter-City Relay Systems between Boston and Springfield, a one year contract providing for 165 hours of transmission at a cost of $16,500 was agreed to in principle and is awaiting formal approval by the WGBH Educational Foundation.

MCET also reached an agreement with Rainbow Programming Services for transmission capacity during the currently vacant daytime hours on their SportsChannel New England programming service. MCET has been granted exclusive rights to sublease this capacity to nonprofit users. Under this agreement, MCET will pay $125 per hour for use of the microwave portion of Sportschannel's distribution system, to reach cable television headends; $75 an hour to use only the Boston-to-Amherst trunk of the microwave system; and $450 an hour to use SportsChaannel's satellite uplink and transponder (including the cost of getting the signal to the uplink in New York).

Consulting to Educational Institutions

MCET continued to provide consultation services during the fiscal year to various educational institutions relating to their development of telecommunications facilities and services.

MCET assisted Southeastern Massachusetts University in preparing an application for a four-channel ITFS license for its North Dartmouth campus, and a second four-channel license for Cape Cod Community College in West Barnstable. MCET worked with SMU in developing the programming proposal, coordinated the legal and engineering work, and assembled the complete applications which were submitted to the Federal Communications Commission in July 1986.

The Corporation also continued to work with the University of Massachusetts in its efforts to obtain a satellite uplinking facility for the Amherst campus, and with the University of Lowell on several projects, including the linking of the three ULowell campuses via te ecommunications.

MCET also secured free use of satellite transmitting and microwave facilities in the German state of Rheinland-Palatinate for the distribution of Massachusetts college programming to European teaching locations. Boston University has used these facilities to distribute graduate level courses to sites in Great Britain, Belgium and Germany.

MCET/Board of Regents Conference

On November 18 and 19, MCET and the Board of Regents sponsored two presentations by John Radcliffe, Director of the British Broadcasting Corporation's Open University Production Center. The first seminar was directed at persons from Massachusetts higher education actively involved in distance learning projects; the second was limited to chief executive officers from major institutions. The sessions provided Massachusetts educators an opportunity to see samples from and learn about Open University's innovative and acclaimed educational programming.

Gutenberg Conference

MCET and Boston University co-sponsored the Second Annual Gutenberg Conference on June 26, 27 and 28, 1986. The conference also received financial support from The Boston Globe and the World Trade Center of Boston. Communications specialists from the US and Germany attended the three-day conference, along with government leaders such as the Secretary of State of the Federal Republic of Germany to discuss opportunities for transatlantic media exchanges.

MCET Board of Directors

There were several changes in MCET's Board of Directors in FY 86. A number of ex officio board members resigned their positions and therefore their board position. J seph Alviani replaced Evelyn Murphy as Secretary of Economic Affiars; Harold Raynolds replaced John Lawson as Commissioner of Education and Joseph Finnegan was designated interim Chancellor of the Board of Regents of Higher Education, replacing John B. Duff, who had served as MCET's first Board Chairman.

Four additional gubernatorially appointed members resigned from the board and were replaced by the Governor with appointments from their appropriate sector. Lincoln D. Lynch, Superintendent of the Middleborough Public Schools, replaced Robert Spillane in the school superintendent positon; Allen Koenig, president of Emerson College, replaced Boston College President J. Donald Monan in one of the private college president positions; Charles C. Tretter, General Counsel of the New England Governor Association, replaced John Kinnaly of Norwood Tool; and Richard J. Snyder, Chairman of the Board of Trustees of Babson College, replaced Bay Banks President William Wiggan. (See Appendix D for a list of Board members.)

At the Annual Meeting held on March 18, 1986, Dr. David C. Knapp, President of the University of Massachusetts, was elected Chairman of the Board of Directors, and Richard Snyder was elected Vice-Chairman. Secretary Alviani, Attorney Helen A. Donohue and Boston University Pesident Dr. John R. Silber were elected to the Executive Committee. Charles W. Smith and James E. Samels were reelected treasurer and secretary, respectively.

Audit

Attached is a copy of the independent audit conducted for MCET by KMG Main Hurdman (see Appendix E).

APPENDIX A

THE COMMONWEALTH OF MASSACHUSETTS

CORPORATION FOR EDUCATIONAL TELECOMMUNICATIONS

McCormack Building / One Ashburton Place / Boston, MA 02108 / (617) 727-6286

Councillor John B. Duff

Richard A. Borten

MEMORANDUM

Date: ***December 9, 1985***

To: ***Frank T. Keefe, Secretary***
Executive Office of Administration & Finance

From: ***Richard A. Borten, Executive Director***

Subject: ***Plan for Use of $300,000 Added to MCET FY 1986 Budget***

Introduction

Subsequent to Governor Dukakis's approval of a Fiscal Year 1986 budget for the Massachusetts Corporation for Educational Telecommunications (MCET) containing $300,000 more than recommended in House 1, you advised me that it was essential for us to arrive at a clear understanding of how the additional money would be spent before it is obligated in any way.

Correspondence with you and discussions with your designated staff representatives established that the basis of this understanding should be a plan prepared by MCET for your consideration and focused on how the $300,000 would be expended to make use of existing telecommunications capacity for the delivery of educational services. We believe that the utilization of existing capacity for the implementation of pilot projects will provide an invaluable opportunity to test the markets for and the costs associated with the delivery of educational services via telecommunications without placing undue financial burdens on the Commonwealth.

This memorandum presents for your consideration:

A) An outline of proposed pilot projects to demonstrate the viability of delivering educational services via telecommunications;

B) A discussion of the existing transmission capacity available to MCET; and

C) A plan for the expenditure of the $300,000, including anticipated costs for project implementation and the necessary connection of telecommunications capacity.

A. Pilot Projects

After conducting detailed needs assessments and follow-up meetings with 100 institutions, we identified approximately 36 interested in undertaking pilot projects that are consistent with MCET's statutory mandate. Of these, MCET will select and implement projects that are both highly compatible with the Governor's policy initiatives and particularly suited to demonstrating the costs, benefits and market for video transmission of a variety of educational services. However, two factors prevented us from committing MCET to specific projects:

A. We felt constrained from making such commitments, raising institutional expectations, and encouraging the institutions to move forward with costly internal planning before obtaining your approval for use of the $300,000; and

B. Many proposed projects will require MCET to commission expensive, highly specific engineering surveys to determine how participants will be connected into existing systems. We believed it was inappropriate to undertake such obligations in light of our agreement with you.

It is our intent to use existing telecommunications capacity to carry out the most suited of the proposed projects, and to conduct a detailed evaluation of:

- Whether the delivery of educational services via telecommunications on a pilot project basis met institutional goals;

- Whether it is economically and technically feasible to utilize telecommunications for the delivery of such services on a permanent basis;

- Whether institutions and/or target audiences will pay for the delivery of educational services via telecommunications; and

- Whether the state's educational and economic climate will be enhanced by the availability of an educational telecommunications system.

In short, the pilot projects will seek to determine whether the benefits of an educational telecommunications network justify the cost of establishing, maintaining and operating such a network.

Examples of some of the proposed projects are outlined briefly below. Attached as Appendix A are the corresponding draft budgets, prepared by MCET as part of the pilot project planning process.

ADULT LITERACY TELECOURSE - The Board of Library Commissioners estimates that approximately 20% of the Massachusetts adult population is functionally illiterate. The Board and the Department of Education propose delivering an adult literacy telecourse to adult basic education centers, libraries, worksites and homes across the state. Classes would periodically include interactive sessions (with voice return via telephone lines and an audio bridge).

CONTINUING EDUCATION FOR HEALTH CARE PROFESSIONALS - Health care professionals at local hospitals and clinics rarely see the diversity of medical problems treated at urban teaching hospitals. New England Medical Center proposes delivering clinical instructional seminars ("Grand Rounds") via television to affiliated community hospitals in various parts of the Commonwealth. An audio return would enable participation by health care professionals at the reception sites.

COMPUTER EDUCATION - TEACHER TRAINING - The availability of educational computer software and skilled computer teachers in primary and secondary schools varies greatly from community to community, often compounding the gaps between "have" and "have-not" school systems in the Commonwealth. The State Department of Education proposes the transmission of a teacher training program to schools via television and the transmission of educational software via the television signal's "vertical blanking interval" (or VBI, an unused portion of the television signal suited to the transmission of data).

THERMODYNAMICS AT COMMUNITY COLLEGES - The Board of Regents and Massachusetts public universities have determined that graduates of community colleges who go on to baccalaureate engineering programs at 4-year colleges are inadequately prepared in thermodynamics, a critical "foundation" discipline. The Board of Regents and the University of Massachusetts at Amherst propose transmitting via television a series of programs aimed at upgrading and supplementing the thermodynamics curriculum at community colleges.

GRADUATE COURSES TO EUROPEAN TEACHING SITES - Boston University and a number of other Massachusetts institutions are extremely eager to reach military bases, European branch and affiliate locations, and other markets for English-language educational programming. The availability of a satellite uplink in Amherst, MCET's eligibility for access to the INTELSAT international space satellite, and the availability of a European uplink provide an unprecedented opportunity for Massachusetts to become the gateway to educational telecommunications markets overseas.

Boston University proposes to transmit graduate level courses from Boston to the Amherst uplink, to Ludwigshafen via INTELSAT, and to European receive sites via the German uplink. (See discussion of existing telecommunications capacity, below.)

BACCALAUREATE NURSING TELECOURSE - Despite the large number of two-year and diploma programs in nursing offered at Massachusetts hospitals and institutions of higher learning, baccalaureate level training for nurses is increasingly necessary for employment and advancement. Southeastern Massachusetts University (and other degree-granting institutions with nursing programs) has proposed distributing a Bachelor of Science degree course to hospitals, community colleges and other convenient sites around the state. In addition, Boston University has discussed with MCET transmitting Bachelor's and advanced degree nursing courses to overseas military installations via satellite.

PHOTOVOLTAIC SYMPOSIUM - The Commonwealth's leadership in the development of photovoltaic technology has led to the recent creation of the Massachusetts Photovoltaic Center. The Center proposes distributing a symposium course on photovoltaic technology to five Massachusetts colleges and universities and five out-of-state institutions via satellite.

CAREER PLANNING FOR HIGH SCHOOL SENIORS - Boston College proposes to transmit career planning programs to high schools via video. The college suggests enabling students to interact with representatives from the programs in Nursing, Education, Law, Business, Politics and Government.

GOVERNOR'S SEMINARS ON EDUCATIONAL ISSUES - A number of critical issues face educators in all parts of the state: dealing with the AIDS epidemic, drug and alcohol abuse in the schools, interpreting and applying the School Reform Act, etc. Governor Dukakis's office has proposed addressing such issues through a series of educators' seminars transmitted to schools via television with participation via voice return signal and an audio bridge.

EDUCATIONAL SEMINAR FOR HEALTH CARE ADMINISTRATORS - Massachusetts hospital administrators face a wide range of management and health care issues in a constantly changing environment. The Massachusetts Hospital Association proposes the transmission of video seminars to key hospitals around the state with audio return via telephone.

TEACHER TRAINING - Boston University produces a series of television programs aimed at upgrading primary and secondary level teaching skills. The series, entitled "Educator's Update," has already attracted the interest of mathematics and developmental reading teachers. Boston University proposes telecasting the 56-minute segments to Massachusetts schools.

BI-LINGUAL EDUCATION - TEACHER DEVELOPMENT PROJECT - The University of Massachusetts at Boston proposes the creation of an interactive teleconferencing network intended to develop university/public school partnerships for serving non-English speaking students. The pilot project will expand UMass/Boston's program on the methodologies for bi-lingual teaching to schools in Massachusetts.

MCET seeks to use a major portion of the $300,000 for the implementation of pilot projects.

B. Existing Transmission Capacity

Since July, MCET has been engaged in lengthy negotiations with owners of existing transmission facilities regarding our use of excess capacity. In particular, we have negotiated with:

The SportsChannel - regarding daytime use of its cable television "premium service" reaching cable systems in approximately 90 Massachusetts cities and towns via microwave and/or satellite;

The Boston Catholic Television Center - regarding use of excess capacity on the Archdiocese's Instructional Television Fixed Service (ITFS) reaching selected sites within Rte. 495;

The WGBH Educational Foundation - regarding use of excess capacity on WGBH's and the House of Representatives's two-way microwave relay systems between Boston and Mt. Tom in Holyoke;

Cable Television System Operators - regarding use of their local government and educational access channels; and

The Scientific Atlanta Company - for the contribution of a steerable C-band satellite transmitting facility (uplink) to be located at the University of Massachusetts in Amherst.

While we are still reaching closure on formal agreements with these entities, we now have a clear sense of the cost of using their transmission capacities, of the limitations of each of the systems, and of the basic connections necessary to make use of the systems.

Each of the existing Massachusetts telecommunications systems has certain limitations and constraints:

The SportsChannel's overall value is limited by the fact that it is essentially a one-way transmission system carried by separate microwave links from the channel's control center in Woburn (and an insert point at North Station) to affiliated cable systems. Although a substantial number of potential MCET receive sites have connections to their local cable systems, most do not subscribe to premium channels, and will have to do so. Further, each cable operator may impose a transmission charge that we are estimating to be $150 per hour. (Because SportsChannel intends to abandon microwave distribution in favor of satellite distribution from an uplink on Long Island next year, this system will be useful only in the short-term.)

Boston Catholic Television signals are transmitted by a low power omni-directional microwave over Instructional Television Fixed Service (ITFS) frequencies to suitably located sites equipped with special ITFS antennas. Limitations are imposed by geography, topography and the expense of acquiring ITFS antennas. Moreover, the Archdiocese's official policies preclude certain program content from being transmitted over the BCTV channels.

The WGBH and House of Representatives Inter-city Relay Systems are very valuable resources that can serve as a highway between the Boston area and the Pioneer Valley. However, the utility of this "highway" is limited by virtue of its design --- it has no exit or entrance ramps along the way. The systems essentially connect the WGBH studios in Boston and the WGBY studios in Springfield (with a micowave termination at Mt. Tom and a connection to the cable system serving Springfield and Longmeadow). In order to serve both the short-term goals of the projects cited above (twenty-five percent of which rely on connections between Boston and Amherst or other locations in the Pioneer Valley) and the long term educational telecommunications aims of institutions like the University of Massachusetts, Boston University, hospitals, etc., it is critical this "highway" be connected to Amherst.

C-Band Satellite Uplinking is highly flexible in that it is unaffected by most geographic or topographic factors. However, this technology requires the availability of a satellite downlink at the receive site, and the purchase of satellite transponder time. Many Massachusetts institutions already have downlinks (40 Massachusetts hospitals have purchased such equipment in the past six months), as do virtually all cable system control centers.

Because very few steerable C-band uplinks are available on a common-carrier basis in New England (the nearest common-carrier uplink, located in Hartford, is both costly and in high demand), the uplink at UMass/Amherst should be a major asset to the Commonwealth.

In the Spring of 1985, MCET successfully negotiated for access to satellite capacity in Ludwigshafen, West Germany capable of reaching receive sites throughout Europe. The Ansalt fur Kabelkommunikation, the Prime Minister of the German state of Rheinland-Pfalz (Rhineland Palatinate) and the German Bundespost (postal and telecommunications department) have given Boston University (which operates 51 European teaching sites) free use of these facilities as a test of their value to US colleges and universities.

MCET's relationship with the German uplinking facility (Anstalt fur Kabelkommunikation) provides the opportunity for Massachusetts to serve as the gateway for institutional access to European communications markets.

The value of the generously contributed uplinking facility at UMass/Amherst will be minor if institutions in various parts of the state cannot reach it with TV signals. MCET hopes to utilize existing WGBH/House inter-city relay system capacity and a link from Springfield to Amherst to provide access to the uplink.

Therefore, MCET seeks to use a portion of the $300,000 to link the termination point of the WGBH/House system and the campus of the University of Massachusetts. We are confident that whatever future policies evolve regarding network development in Massachusetts, this link will always be of value to the state and the higher education community.

C. **Proposed Expenditure of $300,000**

In summary, MCET proposes to use the $300,000 withheld from our FY 1986 budget to implement pilot projects and to link existing transmission capacity to UMass/Amherst.

The costs for both of these activities are outlined below:

Pilot Projects (See Appendix A for Detailed Breakdown)		
Transmission/Engineering	100,000	
Personnel (Excluding existing staff)	14,500	
Equipment	7,500	
Travel	3,000	
General & Administrative Overhead	25,000	
SUBTOTAL		$150,000
12GHz Bi-Directional Microwave Link (Mt. Tom - Amherst)		
Radio Equipment	65,000	
Modulation/De-modulation	35,000	
Antennas/Waveguide	15,000	
Hardware	4,500	
Video Switcher	15,000	
Spare Parts	5,500	
Engineering/Installation/ Frequency Coordination	10,000	
SUBTOTAL		$150,000
GRAND TOTAL		$300,000

MCET believes that this plan responds to the provisions outlined by you and your staff. We feel that the pilot projects are truly reflective of the Governor's policy goals and that they can provide an exciting opportunity for the Commonwealth to move forward with educational telecommunications development in a considered way. We are confident that the proposed link between Amherst and existing capacity currently terminating at Mt. Tom will be of genuine value to Massachusetts regardless of the state's future policies concerning the development of a statewide educational telecommunications network.

We look forward to hearing your comments or concerns.

A P P E N D I X A

The attached draft Expense Budgets were prepared by MCET to illustrate the total costs associated with MCET pilot projects. The total costs include in-kind and actual expenses. Included among in-kind expenses is the allocation of existing personnel and administration. Actual costs are cash expenditures necessary for pilot projects.

The expense budgets are broken out into three components:

1. Institutional Expenses - those **actual and in-kind project costs** allocated to the client and the receiving institutions, including production, program acquistion, equipment purchase, and personnel.

2. Pilot Project Expenses - those **actual costs** associated with the transmission of programs, the rental of transmitting/receiving equipment, any necessary travel, additional personnel and general and administrative overhead. A major portion of these pilot project expenses will be subsidized by MCET.

3. MCET Expenses - those **in-kind costs** associated with development, implementation and evaluation of the pilot projects including personnel and general and administrative overhead.

Included among the expenses reflected by these budgets are:

-- Overhead: the rate has been set at 10% of total project cost. Overhead covers general and administrative expenses, including management, legal and technical services, phone, office supplies, photocopying, postage, independent auditing fees.

-- ITFS Downconverters: the costs associated with this item include the purchase and installation of permanent equipment and associated engineering and surveying costs. Whenever possible, equipment may be leased for pilot projects.

-- Vertical Blanking Interval encoders and decoders: these costs include the purchase of this equipment. It is possible that MCET may be able to arrange the lease or loan of equipment for pilot projects.

-- Audio Equipment: these costs reflect the lease of equipment on a per project basis. MCET may be able to reduce these costs by efficient scheduling and the purchase and lease of equipment that can be shared among pilot projects.

-- Travel: this cost includes mileage, tolls and parking.

-- Microwave Links: this cost is based on a per day, per project basis. MCET may be able to reduce these costs by efficient scheduling of pilot projects.

-- Studio and Equipment: these rates reflect different costs associated with independent production companies and university-owned facilities.

Abbreviations used in the expense budget include:

1. BCTV: Boston Catholic Television
2. d.c.: downconverter
3. ICRS: Intercity Relay System
4. ITFS: Instructional Television Fixed Service
5. SC: SportsChannel
6. VBI: Vertical Blanking Interval

PILOT PROJECT TITLE: Adult Literacy Telecourse

CLIENT:	Mass. Board of Library Commissioners
RECEIVE SITES:	Ten libraries, Adult Basic Education centers and worksites throughout Massachusetts.
PILOT PROJECT DESCRIPTION:	Twelve sessions, three of which include interactive components (audio return), transmitted via the Sportschannel and the Boston Catholic ITFS System.

DRAFT EXPENSE BUDGET	Institut'l	Pilot Proj.	MCET
Program Acquisition Fee	2,500		
Production			
3 events @ 500/event	1,500		
Transmission			
Remote location to MCET:			
3 days @ 750/day		2,250	
MCET to BCTV:			
12 days @ 750/day		9,000	
MCET to SC:			
12 days @ 750/day		9,000	
BCTV: 18 hrs @ 100/hr		1,800	
SC: 18 hrs @ 125/hr		2,250	
Audio:			
-Equip 11 sites @ 91/mo, 3 mo		3,003	
-phone @ 45/hr/site		2,970	
Cable:			
- inst & 3 mos service			
5 sites @ 95/site		475	
- trans/5 sites			
18 hrs @ 150/hr/site		13,500	
ITFS Downconverters:			
5 d.c. @ 3000/d.c.	15,000		
Personnel			
BLC: 2 staff (Planning, publicity, training, implementation, evaluation)			
15 days @ 100/day	3,000		
Site Coords: 10 staff (Training, implementation evaluation)			
10 days @ 75/day	7,500		

DRAFT EXPENSE BUDGET	Institut'l	Pilot Proj.	MCET
MCET: 2 staff (Planning, publicity, training, implementation, evaluation 15 days @ 120/day		2,100	1,500
Clerical @ 60/day BLC - 3 days	180		
MCET - 3 days			180
Travel 2000 miles @ .25/mile		500	
Gen'l & Admin Overhead @ 10%		6,136	2,045
TOTALS:	33,280	52,984	3,725
TOTAL PROJECT COST:	**$89,989**		

PILOT PROJECT TITLE: Continuing Education for Health Care Professionals

CLIENT:	New England Medical Center
RECEIVE SITES:	Hospitals affiliated with New England Medical Center, located in 5 Massachusetts communities
PILOT PROJECT DESCRIPTION:	Medical Seminar ("Grand Rounds") consisting of 60 minute tape and live follow-up, transmitted via the SportsChannel with audio return.

DRAFT

EXPENSE BUDGET	Institut'l	Pilot Proj.	MCET
Production			
60 minute lecture @ 100/minute	6,000		
Studio & Equip: 4 hrs @ 200/hr	800		
Crew: 8 @ 32/hr - 4 hrs	1,024		
Talent: 2 MD's, moderator	5,000		
Transmission			
NEMC to MCET: 1 day @ 750/day		750	
MCET to SC: 1 day @ 750/day		750	
SC: 2 hrs @ 125/hr		250	
Cable:			
- inst & service 5 sites @ 75/site	375		
- trans 2 hrs @ 150/hr/site		1,500	
Audio:			
-Equip 6 sites @ 91/site		546	
-phone 6 sites @ 45/hr/site		270	
Personnel			
NEMC: 2 staff (Planning, publicity, implementation, evaluation) 5 days @ 120/day	1,200		
Site Coordinators: 5 staff (Publicity, training, implementation, evaluation) 3 days @ 100/day	1,500		
MCET staff: 2 staff (Planning, publicity, training, implementation, evaluation) 10 days @ 120/day		1,400	1,000

DRAFT EXPENSE BUDGET	Institut'l	Pilot Proj.	MCET
Clerical @ 60/day			
NEMC: 1 day	60		
MCET: 1 day			60
Travel			
750 miles @ .25/mile		187.50	
Gen'l & Admin. Overhead			
@ 10%		1,700	567
TOTALS:	15,959	7,353.50	1,627

TOTAL COST: $24,939.50

PILOT PROJECT TITLE: Computer Education - Teacher Training

CLIENT:	Department of Education
RECEIVE SITES:	Six School Systems Throughout Massachusetts
PILOT PROJECT DESCRIPTION:	Transmission of instructional computer software via the Vertical Blanking Interval of the television broadcast signal, and a teacher-training session transmitted live via the SportsChannel from UMass/Boston with audio return.

DRAFT EXPENSE BUDGET	Institut'l	Pilot Proj.	MCET
Production			
Studio & Equip: 4 hrs @ 100/hr	400		
Crew: 8 @ 32/hr - 4 hrs	1,024		
Talent: 2 instructors	3,000		
Transmission			
Equipment:			
VBI Encoder	3,000		
6 VBI Decoders @ 995 decoder	5,970		
UMass Boston to MCET: 1 day @ 750/day		750	
MCET to SC: 1 day @ 750/day		750	
WGBH to WGBY:			
VBI Broadcast @ 305/hr		1,220	
Engineering 4 hrs @ 32/hr + 21%	310		
SC: 2 hrs @ 125/hr		250	
Cable:			
- inst & 1 mo service 6 sites @ 65/site	390		
- transmission 6 sites @ 150/hr/site		1,800	
Audio:			
- Equip 7 sites @ 91/site		637	
- Phone 7 sites @ 45/hr/site		630	
Personnel			
MET: 4 staff (Planning, training, publicity, implementation, evaluation) 10 days @ 100/day	4,000		
Site Coords: 6 staff (Training, Implementation, evaluation) 3 days @ 100/day	1,800		

DRAFT EXPENSE BUDGET	Institut'l	Pilot Proj.	MCET
Personnel cont.			
MCET: 2 staff (Planning, publicity, training, implementation, evaluation) 10 days @ 120/day		1,400	1,000
Clerical @ 60/day MET: 5 days	300		
MCET: 5 days			300
Travel 1000 miles @ .25/mile		250	
Gen'l & Admin. Overhead + 10%		2,188	730
TOTALS:	20,194	9,875	2,030
TOTAL PROJECT COST:	**$32,099**		

PILOT PROJECT TITLE: Thermodynamics at Community Colleges

CLIENT:	UMass/Amherst, in cooperation with Board of Regents, Bay State Skills Corp.
RECEIVE SITES:	Springfield Technical Community College, Holyoke Community College, Berkshire Community College
PILOT PROJECT DESCRIPTION:	Ten Thermodynamics seminars, 5 taped, 5 live with audio return, will originate from UMass/Amherst and be transmitted via microwave to WGBY in Springfield. WGBY will broadcast the programming.

DRAFT EXPENSE BUDGET	Institut'l	Pilot Proj.	MCET
Production:			
Studio & Equip: 20 hrs @ 100/hr	2,000		
Crew: 8 @ 32/hr	5,120		
Talent: Instructor	5,000		
Transmission:			
Amherst to Springfield:			
10 days @ 1500/day		15,000	
WGBY: 10 hrs @ 137/hr		1,370	
Audio:			
- Equip. 4 sets for 2 mo @ 91/mo		728	
- 4 sites using State WATS 5 hrs @ 20/hr		400	
Personnel			
UMass Coordinator: (Planning, course development publicity, training, implementation, evaluation) 20 days @ 120/day	2,400		
Comm. Colleges Coords: 3 staff (Course Development, publicity, training, implementation, evaluation) 20 days @ 100/day	6,000		
BSSC: 1 staff (Planning, publicity, evaluation) 20 days @ 120/day	2,400		

DRAFT EXPENSE BUDGET	Institut'l	Pilot Proj.	MCET
Personnel cont.			
Board of Regents: 1 staff (Planning, publicity evaluation) 10 days @ 150/day	1,500		
MCET: 2 staff (Planning, publicity, training, implementation, evaluation) 20 days @ 120/day		2,800	2,000
Clerical: @ 60/day			
UMass - 10 days	600		
BSSC - 2 days	120		
MCET - 3 days			180
Travel 1700 miles @ .25/mile		425	
Gen'l Admin Overhead + 10%		3,603	1,201
TOTALS:	25,140	23,086	3,381
TOTAL PROJECT COST:	**$52,847**		

PILOT PROJECT TITLE: Graduate Courses to European Teaching Sites

CLIENT:	Boston University
RECEIVE SITES:	Various Educational Institutions and military installations throughout Western Europe.
PILOT PROJECT DESCRIPTION:	10 pre-produced 1.5 hr-long graduate level courses belonging to BU will be transmitted via the WGBH Intercity Relay System to Springfield, then via a microwave link to the C-Band satellite uplink in Amherst for transmission via INTELSAT to Europe.

DRAFT EXPENSE BUDGET:	Institut'l	Pilot Proj.	MCET
Transmission			
WGBH tape playback fee:			
20 hrs @ 103/hr (inc. o.h.)		2,060	
WGBH ICRS to Springfld:			
20 hrs @ 150		3,000	
WGBY to uplink at UMass/Amherst			
-10 days at 1500/day		15,000	
-Engineering 10 days @ 400/day		4,000	
Satellite Fees			
-(US) 20 hrs @ 500/hr		10,000	
-(INTELSAT) 20 hrs @ 1,020/hr	20,400		
-(Europe) 20 hrs @ 750/hr	15,000		
-(Ludwigshafen) No charge	0		
Personnel*			
BU Coordinator: (Planning, publicity, implementation, evaluation)			
10 days @ 150/day	1,500		
MCET: 2 Coordinators (Planning, publicity, implementation, evaluation)			
10 days @ 120/day		1,400	1,000
Clerical @ 60/day			
BU - 10 days	600		
MCET - 5 days			300
Travel			
500 miles @ .25/mile		125	

DRAFT EXPENSE BUDGET:	Institut'l	Pilot Proj.	MCET
Gen'l & Admin Overhead @ 10%		5,579	1,860
TOTALS:	37,500	41,164	3,160
TOTAL PROJECT COST:	**$81,824**		

*Institutional costs associated with receive sites have not been included.

PILOT PROJECT TITLE: Baccalaureate Nursing Telecourse

CLIENT:	Southeastern Massachusetts University
RECEIVE SITES:	Bridgewater State College, Massasoit Community College, Bristol Community College, Cape Cod Community College, Parkwood Hospital (N. Bedford), St. Anne's Hospital (Fall River)
PILOT PROJECT DESCRIPTION:	Live transmission of a 24-part course using one-way video via SMU's ITFS system to 6 sites with audio return. ITFS repeater located at Bridgewater to transmit signal to Massasoit Community College.

DRAFT EXPENSE BUDGET	Institut'l	Pilot Proj.	MCET
Production			
Studio & Equip: 48 hrs @ 100/hr	4,800		
Crew: 8 @ 32/hr	12,288		
Talent: Instructor	10,000		
Transmission			
SMU ITFS: 24 hrs @ 50/hr		1,200	
Bridgewater Repeater: 24 hrs. @ 50/hr		1,200	
ITFS Receive Equipment			
5 d.c. @ 3000/d.c.	15,000		
1 d.c. @ 5000/d.c.	5,000		
Audio:			
- Equip 7 sites @ 91/mo/site for 3 mo		1,911	
- phone - 24 hrs 45/hr/site		7,560	
Personnel			
SMU Coordinator and Course Developer (Course development, planning, publicity, implementation, evaluation) 30 days @ 150/day	4,500		
Site Coordinators: 6 staff (Publicity, training, implementation, evaluation) 15 days @ 100/day	9,000		

DRAFT EXPENSE BUDGET:	Institut'l	Pilot Proj.	MCET
MCET: 2 staff (Planning, publicity, training, implementation, evaluation) 20 days @ 120/day		2,800	2,000
Clerical @ 60/day SMU: 8 days	480		
MCET: 3 days			180
Travel 500 miles @ .25/mile		125	
Gen'l & Admin. Overhead @ 10%		5,853	1,951
TOTAL	61,068	20,649	4,131

TOTAL PROJECT COST: $85,848

PILOT PROJECT TITLE: Photovoltaic Symposium

CLIENT:	Massachusetts Photovoltaic Center
RECEIVE SITES:	5 Massachusetts Colleges and Universities with C-Band downlinks; 5 colleges and universities throughout the US who are members of the Overseas Development Council.
PILOT PROJECT DESCRIPTION:	Production and transmission via satellite of pre-produced videotape, followed by live seminar with audio return.

DRAFT

EXPENSE BUDGET	Institut'l	Pilot Proj.	MCET
Production			
10 min tape @ 300/min	3,000		
Studio & Equip: MIT			
4 hrs @ 100/hr	400		
Crew: 8 @ 32/hr - 4 hrs	1,024		
Talent: moderator, 2 experts	5,000		
Transmission			
MIT to WGBH:			
2 hrs @ 100/hr		200	
WGBH to WGBY:			
2 hrs @ 150/hr		300	
WGBY to Uplink at UMass/Amherst:			
- 1,500/day		1,500	
- Engineering		400	
C-Band Transponder:			
2 hrs @ 500/hr		1,000	
Audio:			
-Equip @ 91/site - 11 sites		1,001	
-phone @ 45/hr/site		990	
Personnel			
PV Ctr: 1 staff (Planning, publicity, implementation, evaluation)			
20 days @ 100/day	2,000		
Site Coordinators:			
ODC - 5 staff, 5 days @ 100/day	2,500		
Mass. Colleges - 5 staff, 5 days @ 100/day	2,500		
MCET: 2 staff (Planning, publicity, training, implementation, evaluation)			
10 days @ 120/day		1,400	1,000

DRAFT EXPENSE BUDGET	Institut'l	Pilot Proj.	MCET
Clerical @ 60/day			
PV Ctr - 5 days	300		
ODC - 2 days	120		
MCET - 3 days			180
Travel			
1000 miles @ .25/mile		250	
Gen'l & Admin. Overhead			
@ 10%		1,800	626
TOTALS	16,844	8,921	1,806
TOTAL PILOT PROJECT COST:	**27,571**		

PILOT PROJECT TITLE: Career Planning for High School Seniors

CLIENT:	Boston College
RECEIVE SITES:	Massachusetts High Schools
PILOT PROJECT DESCRIPTION:	Five one hour programs, each consisting of a ten-minute career information tape and live discussion which will be transmitted via the SportsChannel with audio return.

DRAFT EXPENSE BUDGET	Institut'l	Pilot Proj.	MCET
Production			
5 - 10 minute tapes @ 250/minute	12,500		
Studio & Equip: 10 hrs @ 100/hr	1,000		
Crew: 8 @ 32/hr	2,560		
Talent: BC Faculty	2,500		
Transmission			
BC to MCET: 5 days @ 750/day		3,750	
MCET to SC: 5 days @ 750/day		3,750	
SC: 5 hrs @ 125/hr		625	
Cable - inst & 2 mo service 5 sites @ 80/site	400		
- trans @ 150/hr/site		3,750	
Audio: - equip 2 mos @ 91/mo/site		1,092	
- phone @ 45/hr/site		1,350	
Personnel			
BC: (Planning, publicity, training, implementation, evaluation) 10 days @ 120/day	1,200		
Site Coordinators: 5 staff (Training, publicity, implementation, evaluation) 5 days @ 100/day	2,500		
MCET: 2 staff (Planning, publicity,training, implementation, evaluation) 10 days @ 120/day		1,400	1,000

DRAFT EXPENSE BUDGET	Institut'l	Pilot Proj.	MCET
Clerical @ 60/day			
BC - 5 days	300		
MCET - 2 days			120
Travel			
600 miles @ .25/mile		150	
Gen'l & Admin Overhead			
@ 10%		2,996	999
TOTALS	22,960	18,863	2,119

TOTAL PROJECT COST: $43,942

PILOT PROJECT TITLE: Governor's Seminars on Educational Issues

CLIENT: Governor's Office
RECEIVE SITES: Public Schools in 5 communities throughout the Commonwealth
PILOT PROJECT DESCRIPTION: Five seminars, occuring within a two month period, transmitted live to 5 public schools via the Sportschannel, with an audio return.

DRAFT
EXPENSE BUDGET

	Institut'l	Pilot Proj.	MCET
Production			
(from State House)			
5 programs @ 500/program	2,500		
Transmission			
State House to MCET:			
5 days @ 750/day		3,750	
MCET to SC:			
5 days @ 750/day		3,750	
SC: 5 hrs @ 125/hr		625	
Cable:			
- inst & 2 mos service			
5 sites @ 80/site	400		
- transmission - 5 sites			
5 hrs @ 150/hr/site		3,750	
Audio:			
-Equip 6 sites			
2 mos @ 91/mo/site		1,092	
-phone 5 hrs @ 45/hr/site		1,350	
Personnel			
Governor's Office: 2 staff			
(Planning, publicity,			
implementation, evaluation)			
10 days @ 120/day	2,400		
Site Coordinators: 5 staff			
(Training, publicity,			
implementation, evaluation)			
5 days @ 100/day	2,500		
MCET: 2 staff			
(Planning, publicity,training,			
implementation, evaluation)			
10 days @ 120/day		1,400	1,000
Clerical @ 60/day			
Gov: 2 days	120		
MCET: 2 days			120

DRAFT EXPENSE BUDGET	Institut'l	Pilot Proj.	MCET
Travel 1000 miles @ .25/mile		250	
Gen'l & Admin. Overhead @ 10%		1,876	625
TOTAL:	7,920	17,843	1,745
TOTAL PROJECT COST:	**$27,508**		

PILOT PROJECT TITLE: Educational Seminar for Health Care Administrators

CLIENT:	Mass. Hospital Association
RECEIVE SITES:	Four MHA member hospitals located in Springfield, Fitchburg, Brockton and Beverly
PILOT PROJECT DESCRIPTION:	A seminar, originating at Beth Israel Hospital, transmitted live via the Sportschannel with audio return, to four regional sites.

DRAFT EXPENSE BUDGET	Institut'l	Pilot Proj.	MCET
Production			
Studio & Equip: 4 hrs @ 200/hr	800		
Crew: 8 @ 32/hr - 4 hrs	1,024		
Talent: mod, 2 administrators	5,000		
Transmission			
BI to MCET link: 1 day @ 750/day		750	
MCET to SC: 1 day @ 750/day		750	
SC: 2 hrs @ 125/hr		250	
Cable:			
- inst. and service - 1 mo 4 sites @ 65/site	260		
- trans./10 sites 2 hrs @ 150/hr		1,200	
Audio:			
-Equip 5 sets @ 91/set		455	
-phone @ 45/hr/site		450	
Personnel			
MHA: 2 Coord. (Planning, publicity, implementation, evaluation 2.5 days @ 150/day	750		
BI: 1 staff (Planning, production, implementation) 5 days @ 120	600		
Regional Sites: 4 Coords. (Planning, training, implementation, evaluation) 4 days @ 120/day	1,920		

DRAFT EXPENSE BUDGET	Institut'l	Pilot Proj.	MCET
MCET: 2 staff (Planning, training implementation, evaluation) 8 days @ 120/day		1,120	800
Clerical @ 60/day			
MHA: 2 days	120		
BI: 2 days	120		
MCET: 4 days			240
Travel 850 miles @ .25/mile		212.50	
Gen'l & Admin Overhead @ 10%		1,261.65	420.50
TOTALS	10,594	6,449.15	1,460.50
TOTAL PROJECT COST:	**$18,503.65**		

PILOT PROJECT TITLE: Teacher Training

CLIENT: Boston University
RECEIVE SITES: Ten public school systems throughout Massachusetts
PILOT PROJECT DESCRIPTION: Transmission via the SportsChannel of 6 pre-produced programs belonging to BU to 10 public schools over a two month period. Each program is one hour in length.

DRAFT EXPENSE BUDGET	Institut'l	Pilot Proj.	MCET
Transmission			
MCET to SC:			
6 days @ 750/day		4,500	
internal wiring - 22nd fl. to roof		200	
SC: 6 hrs @ 125/hour		750	
Cable:			
- inst & 2 mos service 10 sites @ 80/site	800		
- trans/10 sites 6 hrs @ 150/hr		9,000	
Personnel			
BU Coordinator: (Planning, publicity, implementation, evaluation)			
3 days @ 150	450		
Site Coordinators: 10 staff (Training, implementation, evaluation)			
2 days @ 100/day	2,000		
MCET: 2 staff (Planning, publicity, training, implementation, evaluation)			
5 days @ 120/day		700	500
Clerical @ 60/day			
BU: 1 day	60		
MCET: 1 day			60
Travel			
50 miles @ .25/mile		12.50	

DRAFT EXPENSE BUDGET	Institut'l	Pilot Proj.	MCET
Gen'l & Admin Overhead @10%		1,371	475.25
TOTALS:	3,310	16,533.50	1,017.75

TOTAL PROJECT COST: $20,110.75

PILOT PROJECT TITLE: Bi-Lingual Education - Teacher Training Project

CLIENT:	UMass/Boston
RECEIVE SITES:	Public Schools in Boston, Brookline, Lowell, Lawrence, Somerville, Quincy
PILOT PROJECT DESCRIPTION:	Transmission of three live one-hour programs via BCTV with audio return. ITFS signal repeated in Lowell to reach Lawrence and Lowell.

DRAFT EXPENSE BUDGET	Institut'l	Pilot Proj.	MCET
Production			
Studio & Equip: 6 hrs @ 100/hr	600		
Crew: 8 @ 32/hr - 6 hrs	1,536		
Talent: 1 faculty member			
3 sessions @ 500/session	1,500		
Transmission			
UMass to MCET:			
3 days @ 750/day		2,250	
MCET to BCTV: 3 days @ 750		2,250	
BCTV: 3 hrs @ 100/hr		300	
ITFS Downconverters			
6 d.c. @ 300/d.c.	18,000		
Audio:			
- Equip 7 sites @ 91/site		637	
- phone 3 hrs @ 45/hr/site		945	
Personnel			
UMass Coordinator: (Planning, publicity, implementation, evaluation)			
20 days @ 100/day	2,000		
Site Coordinators: 6 staff (Training, implementation evaluation			
5 days @ 100/day	3,000		
MCET: 2 staff (Planning, publicity, training implementation, evaluation)			
10 days @ 120/day		1,400	1,000
Clerical @ 60/day			
UMass: 5 days	300		
MCET: 3 days			180

DRAFT EXPENSE BUDGET	Institut'l	Pilot Proj.	MCET
Travel 600 miles @ .25/mile			150
Gen'l & Admin. Overhead @ 10%		2,705	900
TOTALS:	26,936	10,637	2,080
PROJECT TOTAL COST:	**$39,653**		

APPENDIX B

Lincoln Filene Center for Citizenship & Public Affairs
An Assessment of the "Solutions Unlimited" and "Teaching Adults to Read Through Television" Teleconferences

EXECUTIVE SUMMARY

The Lincoln Filene Center for Citizenship and Public Affairs at Tufts University conducted in-depth interviews and written questionnaire surveys with participants in two pilot teleconferences. The "Solutions Unlimited" teleconference, co-sponsored with the Massachusetts Department of Education and held on May 21, 1986, involved an origination site at Bunker Hill Community College and receive sites in Boston, Chicopee, Dracut, and Greenfield. Elementary and middle school teachers were able to share experiences and expectations concerning the use of a multi-media package directed toward teaching problem-solving skills.

Based on the interviews and questionnaire responses, the teleconference appears to have been highly successful. All of the planners, site coordinators, and panelists interviewed felt that the teleconference was well-done, unique, and well worth doing again. Educators who participated gave generally high evaluations. Overall, half of the participants answering written questionnaires rated the teleconference as "excellent," and more than a third rated it as "very good."

From our questions regarding what might be done to improve future teleconferences, the following suggestions are made:

- Teleconference planners should specify several weeks in advance exactly who it is they want and expect to participate in the teleconference.

- Planners should take steps to ensure that those people who are the expected participants do in fact participate. In other words, greater outreach to the targetted groups needs to be accomplished.

- The content and focus of the panel presentations, if any, should be directed at the level of the people who are participating. In the "Solutions Unlimited" teleconference, it is apparent that those who already had some experience with "Solutions Unlimited" felt that the content was perhaps a bit redundant. It did not address many of the questions they wanted addressed. On the other hand, those who had not been exposed to "Solutions Unlimited" tended to feel that the panel assumed they knew something about the product. Since they didn't, many of these participants felt left out of the panelists' discussions, epsecially those which took place before the demonstration.

- Some clear guidelines should be developed as to technical details since audio loss and feedback tended to be such a noticeable problem. Some recommendations should be developed as to how to avoid these.

- MCET might consider developing the capacity to conduct extensive audio and video tests immediately preceeding the start of the teleconference. Under current arrangements access to video transmission media is seriously constrained which often results in the emergence of untimely technical problems. These problems, such as the camera malfunction and audio feedback, tend to be relatively minor and easily rectifiable. However, existing time constraints on access force these problems to be

overcome during the teleconference itself. And these relatively minor technical problems, as reflected in the teleconference evaluations, tend to become major distractions to participants. Developing the capacity to iron out these problems before the teleconference begins would improve the medium greatly.

The second teleconference, held on June 9, 1986, was similarly evaluated. This teleconference, "Teaching Adults to Read Through Television," was co-sponsored with the Massachusetts Board of Library Commissioners. It was focused on the question "How effective is, and what is the potential for, using television in adult reading education?" It involved a variety of participants at an origination site at the Roxbury studio of Cablevision of Boston, and receive sites in Allston, Holden, Somerville, and South Hadley. Based on interviews and questionnaires, this teleconference seems to have been somewhat less well-received. Overall, only about three percent of the participants rated the teleconference as "excellent," while over a third rated it "good," and nearly half said it was "fair."

Participants cited a variety of reasons for their assessments of the teleconference. Some found problems with audio so distracting that they could not focus on the substance of the teleconference. Others objected to the design of the teleconference which seemed not to promote inter-site interactions. Still others felt that the substantive content of the teleconference was not well conceived.

Based on the variety of comments and suggestions, the following recommendations are made for future teleconferences:

- Most participants felt that much more needs to be done to rectify technical problems, especially audio problems, before the teleconference begins.

- More effort should be made to ensure that the substantive content and logistics fit the teleconferencing format being used. In retrospect, having a presentation originate from what was designed as a receive site (Somerville) seemed to create a sense of poor use of the technology. This lead many participants to recommend that multiple origination sites be utilized.

- An effort should be made to design the teleconference so that it is more interactive and spontaneous. If possible, comments from receive sites should be able to occur when it is appropriate rather than when it is convenient for the technology given the teleconference's design and format. For example, when questions are directed to someone at a receive site from someone at another receive site, as was the case after Mr. Pero made his presentation, there should be a way for the two parties to interact. Sponsors should be encouraged not to try to exercise control over who speaks and when by preventing or discouraging inter-site communication. One solution would be for receive site coordinators to be asked to play the role of site moderator. In this way, the site coordinator might be asked to try to exercise control rather than relying on what is almost universally perceived as adherence to rigid communication rules.

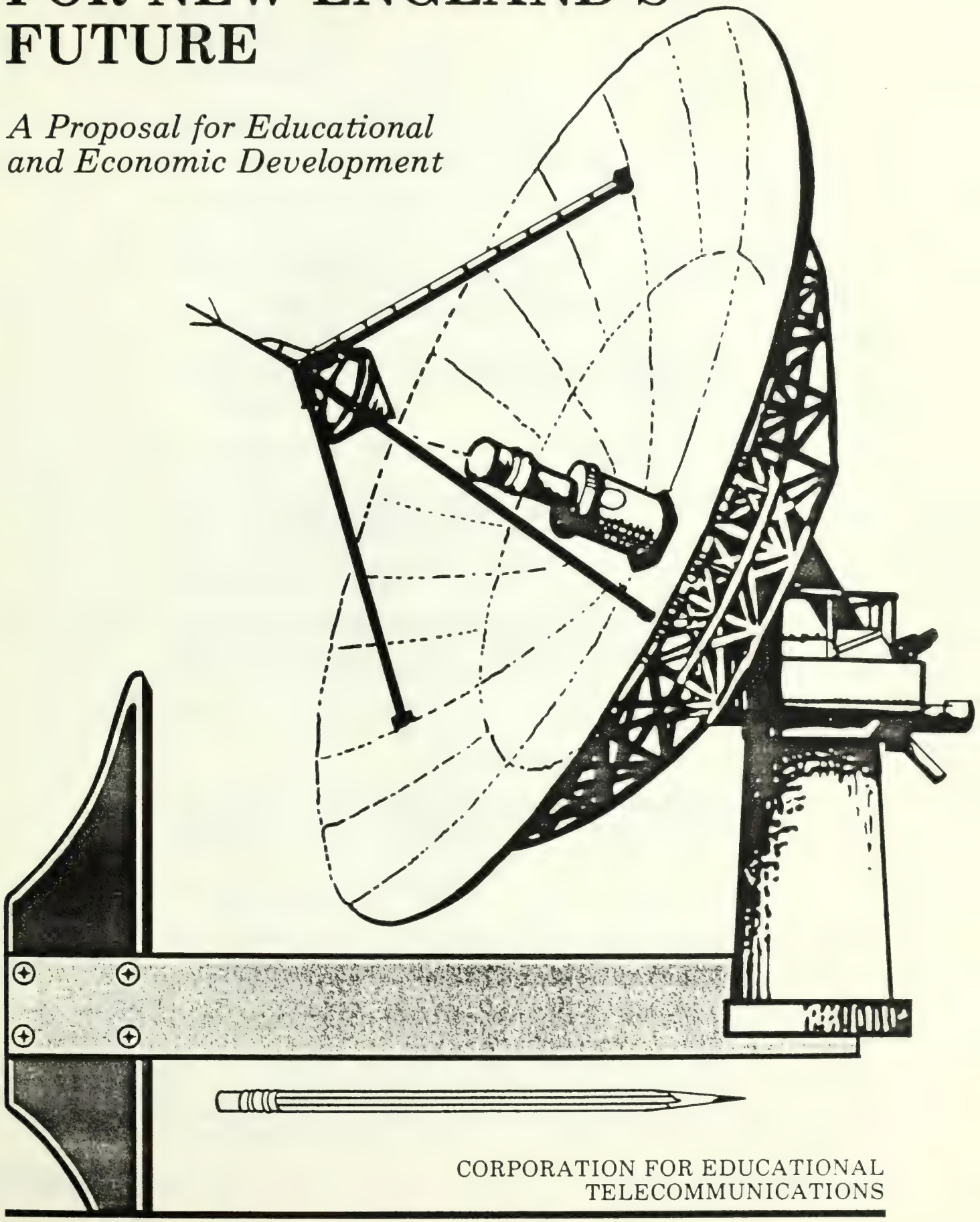
- As was the case with the "Solutions Unlimited" teleconference, some specific detailed technical guidelines should be prepared to facilitate avoidance and remedy of audio problems. These should make recommendations concerning the preferred physical configuration of the receive sites. Attention should be given to the proximity of the origination site's audio and how it interacts with the receive sites' microphones.

- Finally, this teleconference reinforced the idea that MCET should try to improve its capacity for obtaining sufficient teleconferencing network access prior to the start of the teleconference. Clearly there is a pronounced need to test the network for a concentrated period of time before the teleconference begins. Again, this is necessary to ensure that what otherwise would be minor technical problems do not become so distracting that they diminish the substantive messages being conveyed.

APPENDIX C

TELECOMMUNICATIONS FOR NEW ENGLAND'S FUTURE

A Proposal for Educational and Economic Development



CORPORATION FOR EDUCATIONAL TELECOMMUNICATIONS

TELECOMMUNICATIONS FOR NEW ENGLAND'S FUTURE

A Proposal for Educational and Economic Development

Massachusetts Corporation for
Educational Telecommunications

Boston University

University of Massachusetts

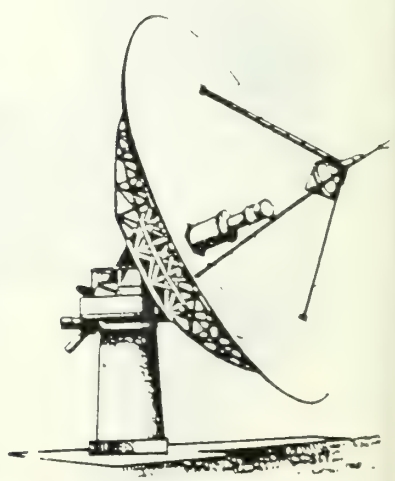


TABLE OF CONTENTS

Executive Summary

I. Introduction 1

II. Education for Economic Growth 4

A. Primary and Secondary Education 8

B. Continuing Education for Industry 11

III. Meeting Educational and Economic Needs Through a Model Advanced Telecommunications Network 16

A. Addressing the Needs of Primary and Secondary Schools 19

B. Continuing Professional Development for Teachers 23

C. Continuing Education for Industry 24

IV. Technology Resource Centers: The Cornerstones of the Telecommunications Network 32

V. The Telecommunications Network: A Technical Design 42

VI. Massachusetts and New England: An Ideal Location for a National Demonstration of Educational Telecommunications 49

References

Appendices

1. Enabling Legislation for the Massachusetts Corporation for Educational Telecommunications (MCET)

2. Background on MCET

3. MCET Board of Directors, Staff, and Consultants

4. Letters of Endorsement for the MCET Network

5. Technical Design of the MCET Network

6. News Articles Addressing the Need for and Uses of Telecommunications Technology in Stimulating Economic and Educational Development

EXECUTIVE SUMMARY

According to the President's Commission on Industrial Competitiveness, the most serious challenge facing the United States today is its inability to compete in world markets. The recent decline in the quality of education in America has resulted in a severe shortage of the skilled scientists and engineers upon whom the nation's industries depend for technological innovation. To the extent that the country lacks a work force with adequate technical qualifications, its ability to sustain the technological revolution essential to the future of the American economy is at risk.

The educational system in this country has not kept pace with technological change and economic challenge. Our primary and secondary schools do not adequately prepare our students for the demands of the workplace or for higher education; our college graduates are not as proficient in science, math, and foreign languages as are our international competitors; continuing education and retraining programs for workers are inadequate to meet economic demands; and both private and public academic institutions, business and industry, and hospitals and libraries, are not effectively sharing resources and technologies to their mutual advantage.

The Massachusetts Corporation for Educational Telecommunications (MCET), a public instrumentality created by the state Legislature in 1982, joined by Boston University and the University of Massachusetts

at Amherst, proposes that the federal government provide support for the development of a model educational telecommunications network. This network, the first of its kind, will use state-of-the-art telecommunications technology to link electronically primary and secondary schools, colleges, universities, hospitals, and business and industrial worksites. It will be anchored by two regional, university-based Technology Resource Centers that will provide programming, data, and technical assistance services.

The network will demonstrate how creative use of advanced telecommunications technologies can:

1. Improve educational opportunities for students in primary and secondary schools, particularly in the crucial areas of math, science, and foreign languages, by offering courses not currently available to them, and by providing continuing professional development programs for primary and secondary school teachers;

2. Promote economic development by providing low cost, accessible, high quality continuing education for the labor force;

3. Facilitate the sharing of information among and between the private and public sectors, and among educational institutions at all levels, through interactive data exchange and teleconferencing; and

4. Facilitate the efficient and cost-effective use of scarce educational resources.

The telecommunications network will use satellite and microwave transmission systems to reach all educational and industrial sites in the Commonwealth, regardless of their geographical location or topographical characteristics. It will be capable of addressable, two-way interactive television, voice and data communication. The system envisioned by MCET is both affordable and easily expandable to meet future increased demand within the state and throughout New England.

The Technology Resource Centers, operating as an integral part of the new network, will help educational institutions and private enterprises make effective use of the transmission capacity provided by the MCET network. They will work with client institutions and individuals to develop, evaluate, and distribute television programming and computer software.

Through these Centers, network users will have access to academic and industrial experts in a wide range of disciplines, including instructional technology, computer science, and television production. The Centers will provide an environment in which educators, technical specialists, and business leaders can work together to devise technological solutions to education and worker training problems.

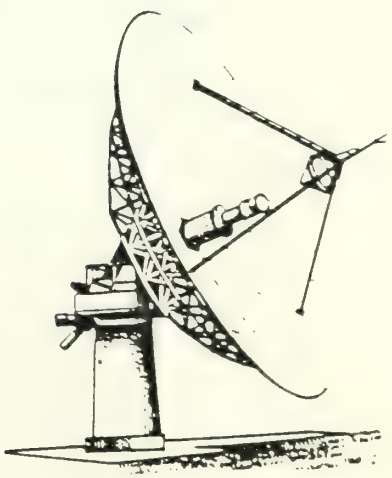
Massachusetts and New England are ideal laboratories in which to demonstrate the effective use of advanced telecommunications in education and training. In significant respects, the region is representative of the rest of the nation: it has aging and emerging industries, cities and suburbs of great affluence along with depressed urban and rural areas, and wide disparities in educational opportunities for young people.

MCET believes that the use of advanced telecommunications technology can be the key to the modernization of America's classrooms. It envisions its network as a system that will help to increase educational opportunity for students throughout the state, and that will, through its links to business and industry, help retrain workers and modernize industries in economically depressed areas.

The MCET proposal offers an opportunity to establish a model educational telecommunications network that can serve as an example for the improvement of educational systems everywhere.

This project promises significant benefits not only for Massachusetts and New England, but for the entire nation. The funding of this project will be a social investment of the highest order, an investment in the nation's educational and economic future.

PROPOSAL FOR A NEW ENGLAND EDUCATIONAL TELECOMMUNICATIONS NETWORK AND TECHNOLOGY RESOURCE CENTERS



I. INTRODUCTION

The recent decline in the quality of education in America has resulted in a severe shortage of the skilled scientists and engineers upon whom the nation's industries depend for technological innovation. To the extent that the country lacks a work force with adequate technical qualifications, its ability to sustain the technological revolution that is essential to the future of the American economy is at risk.

To provide a model for the nation in use of telecommunications to enhance education and industrial competitiveness, the Massachusetts Corporation for Educational Telecommunications (MCET), a public instrumentality created by the state Legislature in 1982, proposes to establish the nation's first multi-purpose statewide educational telecommunications network. This model network will use state-of-the-art telecommunications technology -- principally satellite and microwave transmission systems -- to link primary and secondary schools, colleges, universities and hospitals, and businesses and industrial worksites to each other and to two regional, university-based technology resource centers which would provide programming, data, and technical assistance services.

The Massachusetts and New England areas are ideal sites in which to demonstrate the effective use of advanced telecommunications technology in education. In significant respects, the region is representative of the rest of the nation: it has aging and emerging industries, urban and suburban areas of great affluence along with depressed urban and rural areas, and wide disparities in educational opportunities for young people.

MCET believes the use of advanced telecommunications technology can be the key to the modernization of America's classrooms. It envisions its network as a system that will help to increase educational opportunity for students throughout the state, and will, through its links to business and industry in Massachusetts, help to retrain workers and modernize industries in economically depressed areas.

High technology is one of New England's most important industries. Its importance to the region reflects a national trend in the same direction. If the nation is to maintain its leadership in high technology, it needs not only large numbers of skilled scientists and engineers, but also to find innovative ways of keeping them at the forefront of their professions.

The MCET proposal for the use of advanced telecommunications technology in education is an opportunity for such innovation, an opportunity to establish a model educational telecommunications network that can serve as an example for the improvement of educational systems everywhere. Because the project promises significant benefits not merely for Massachusetts and New England, but for the entire nation, it is an appropriate candidate for federal support.

II. EDUCATION FOR ECONOMIC GROWTH

> Knowledge, learning, information, and skilled intelligence are the new raw materials of international commerce. . . If only to keep and improve on the slim competitive edge we still retain in world markets, we must dedicate ourselves to the reform of our educational system for the benefit of all -- old and young alike, affluent and poor, majority and minority. Learning is the indispensable investment required for success in the "information age" we are entering.
>
> -- A Nation At Risk, A report to the Nation and the Secretary of Education by The National Commission on Excellence in Education, April 1983.

According to the President's Commission on Industrial Competitiveness, the most serious challenge facing the United States today is its inability to compete in world markets.[1] While there are many reasons for our nation's declining economic position in the international arena, one alarming factor has been the failure of American educational systems to prepare students for the demands of a new technological era. Our current work force simply lacks the skills and knowledge necessary to keep pace with accelerated technological advances. The labor force suffers from a shortage of available and applicable retraining programs necessary to meet the changing requirements of the workplace.

Furthermore, today's students -- who are tomorrow's workers -- are not receiving the kind of education that is preparing them adequately to take their place in society and the workplace of the future. According to Paul Copperman, a noted analyst of American education, we face an unprecedented crisis:

> Each generation of Americans has outstripped its parents in education, in literacy, and in economic attainment. For the first time in the history of our country, the educational skills of one generation will not surpass, will not equal, will not even approach, those of their parents.[2]

Recent studies have documented the dimensions of the problem that our educational system and our economy face:

-- American students reach college barely literate in math and science. According to a National Science Foundation report, 75 percent of 1980 high school graduates were unqualified to take undergraduate math and science courses.[3]

-- Only one-third of the nation's school districts require more than one year of mathematics and science for graduation, and just half of all high school graduates take mathematics or science beyond the tenth grade.[4]

-- Only 5 percent of all high school students study foreign languages beyond the second year, although the third year is generally regarded as the point at which real competency begins.[5]

-- America is falling behind other nations in producing new engineering and technical professionals. According to a U.S. Senate report, "for every million people, the Soviet Union annually graduates 260 electrical engineers, Japan graduates 163, and the United States a mere 67."[6]

-- U.S. industries face serious shortages of technically trained workers. The American Electronics Association projected in 1983 that 200,000 new positions for electrical engineers and computer scientists would be created over the five-year period ending in 1987. This projected demand is more than double the supply of such graduates our universities will produce in that time period.[7]

-- Some 23 million American adults are functionally illiterate, and in our large cities, 8 percent of our workers are functionally illiterate. In contrast, just 1/2 of 1 percent of Japan's workers are illiterate.

> As economist Dr. Lester Thurow has remarked, "How can you compete with someone when you have on your payroll 16 times the number of illiterates as they do?"[8]

These statistics dramatically underscore the urgency of addressing the educational deficiencies that are threatening our country's economic well-being. If we wish to regain our economic preeminence both at home and abroad, we must be willing to accept and address the fact that there is a growing chasm between what students need to know and what the educational system is providing.

The educational system in this country has not kept pace with technological change. Our primary and secondary schools are not adequately preparing our students for the demands of the workplace or for higher education; our college graduates are not as proficient in science, math, and foreign languages as are our international competitors; continuing education and retraining programs for workers are inadequate to meet economic demands; and both private and public academic institutions, businesses and industry, and hospitals and libraries, are not effectively sharing resources and technologies to their mutual advantage. We can no longer afford to ignore these problems.

A. PRIMARY AND SECONDARY EDUCATION

The ability of our schools to respond adequately to the demands placed upon them has been weakened by several factors:

(1) Local schools have reduced or eliminated course offerings, particularly advanced level courses in math, the sciences, foreign languages, and computer use -- the very subjects most crucial to our future economic growth.

For example, between 1975 and 1981, 72 courses were eliminated from the curricula of nine high schools located west of Boston. Among these were Italian, Greek, German, Advanced Algebra and Project Physics.

Schools are unable to offer courses in subjects that are becoming increasingly important, such as non-traditional foreign languages. A U.S. Senate Committee on Labor and Human Resources reported that:

> Eighty percent of the world's population speaks Chinese, Japanese, and Arabic, yet only one percent of all United States public school students are enrolled in these courses nationwide. From another perspective, one out of six Americans owes his job to foreign trade, yet it has been alleged that Americans lose 100,000 jobs a year because too few of us know a foreign language.[9]

(2) Financial constraints have prevented schools from making full use of high technology teaching tools, because they lack the resources to purchase educational software and instructional computers or to upgrade their laboratories. According to The National Commission on Excellence in Education, computer science now needs to be considered one of the "new basics" required of all high school students.[10] Yet studies indicate that our schools are ill-prepared -- deficient in both the expertise and the equipment needed -- to meet this challenge. In a survey conducted by the Corporation for Public Broadcasting in 1983, 82 percent of elementary and secondary school teachers agreed with the statement that "Computers can help teachers teach more effectively," yet 31 percent said they did not feel comfortable working with a computer and 90 percent of the respondents asked for more training in computer use.[11]

(3) The number of qualified teachers -- especially in the critical areas of math, science, and computer technology -- is inadequate to meet the current needs. In 1981, half of the teachers newly employed nationwide to teach secondary science and mathematics

were not licensed to teach those subjects.[12] A 1983 Time magazine cover story on public education reported that "Massachusetts universities produced only two graduates last June certified to teach chemistry on the high school level and only two who could teach physics."[13] Another report found that only one 1982 college graduate in the entire state of New Hampshire was planning to teach math.[14]

(4) The gap in the quality of the education received by children in rich and poor school districts persists. For example, a recent survey of 114 eastern Massachusetts school districts found that communities with the highest median household incomes had dramatically higher school attendance, higher SAT scores, higher rates of college admissions and college graduates, and a wider range of scholastic, extracurricular and sports activities.[15] Given the economic demands for a highly skilled, well-trained work force, we cannot afford to let this disparity in educational resources continue.

B. CONTINUING EDUCATION FOR INDUSTRY

If the United States is to regain its preeminent role in the international economy, it must have access to a highly skilled and technologically up-to-date work force. Continuing education programs for engineers and other employees in high technology industries are vital. As the Office of Technology Assessment has pointed out:

> In a rapidly advancing technological society, it is unlikely that the skills and information base needed for initial employment will be those needed for the same job a few years later. Lifelong retraining is expected to become the norm for many people.[16]

According to a recent report, we can expect that "one million people a year will lose their jobs and remain unemployed if a means of training them for new jobs is not found."[17] As new technologies change the roles of American workers -- as word processing equipment has already altered the jobs of clerical workers and as robots begin to replace assembly line workers on the factory floor -- increased vocational and industrial retraining will be needed both for dislocated workers and for those whose new jobs require higher and different levels of skills. Continuing education must become the norm for all sectors of society.

Maintaining technological competitiveness is particularly important to the New England economy. According to the U.S. Bureau of Labor Statistics, the three states ranking highest in the nation in high technology jobs as a percentage of all new jobs created between 1975 and 1982 were Massachusetts, New Hampshire, and Vermont. Maine and Rhode Island also placed in the top ten.[18]

New England's growth in high technology jobs, and its increasing economic dependence upon them, reflects a national trend. The Bureau of Labor Statistics projects that seven of the ten fastest growing occupations through 1995 will be computer or electronics-related, especially in the fields of electrical engineering, computer programming, systems analysis, data processing, and computer repair.[19]

Currently, our institutions of higher education are unable to provide the course offerings necessary to meet this growing need. Colleges and universities face a severe faculty shortage in engineering schools, estimated to be approximately 2,500 or 10 percent of the total engineering faculty, with a vacancy rate approaching 50 percent in some high technology specialty areas.[20]

One result of this shortage is that too few American students are obtaining engineering degrees. According to Erich Bloch, the Director of the National Science Foundation:

> Both Japan and the Soviet Union produce proportionately more engineers than the United States. Over the next decade this gap could widen as the size of the U.S. college-age population drops.[21]

Even if our colleges and universities were producing enough engineers, their knowledge would rapidly become outdated in the absence of continuing educational opportunities. A recent report by the Massachusetts Institute of Technology described three principal types of continuing education necessary to keep our work force on the cutting edge of technological innovation:[22]

(1) Graduate degree studies for those who have only bachelor's degrees. While the most commonly required degree in the pure sciences is the doctorate, most engineers terminate their formal education with a bachelor's degree. This level of training is increasingly inadequate to meet the needs of industry.

(2) Updating and broadening basic knowledge in the light of changing technology. According to the MIT report, "An engineer who graduated more than ten years ago

will not have studied a number of important subjects that students are studying today, and may not be conversant with some of the ideas that a newly hired engineering graduate brings to his or her first job."[23] Such professional obsolescence has dire implications, not only for the engineer who has become incapable of participating at the forefront of his or her profession, but for the industry as a whole in its ability to compete with foreign firms which have a better trained workforce.

(3) Advanced and specialized knowledge required for specific industry needs. A baccalaureate engineering degree represents only a foundation of general knowledge upon which the specialized knowledge of a particular industry must be built. This specialized knowledge used to be acquired on the job. There is a growing need for more formal continuing education as the specialized disciplines become more complex.

Industries themselves have sought to address the continuing educational needs of their employees. According to a study by the Carnegie Foundation for the Advancement of Teaching, U.S. companies train almost 8 million people a year -- close to the total enrollment in colleges and universities -- and they spend

nearly as much on education as do the traditional educational institutions.[24] However, most educators believe that corporate educational programs alone cannot reach the numbers of students or provide the same quality of training as those that are college and university-based. The dean of a prominent university's school of management explained:

> Traditional institutions have distinct advantages in the breadth and depth of study offered in their high-quality degree granting programs. . . .By using university services and educational programs, companies can be flexible in committing their staff and money to educational activities. It goes without saying that another advantage is that faculty members at colleges and universities can draw upon strong resources of scholarship and research not available elsewhere.[25]

A collaborative program, in which universities and industries offer and share the best of their resources, is desperately needed to enhance our nation's ability to continually upgrade the skills of its workforce. Neither business nor academia, acting alone, will be able to do so.

III. MEETING EDUCATIONAL AND ECONOMIC NEEDS THROUGH A MODEL ADVANCED TELECOMMUNICATIONS NETWORK

The U.S. will not solve the competitiveness problem until it again becomes the place where the most advanced, highest quality goods and services are produced by the most skilled workers using the most advanced methods. . . . Companies cannot succeed without the basic tools, the most educated work force, and the premier technological base. These require a social investment in the primary and secondary education system, in universities, in research institutes, and in the scientific establishment.

--Michael E. Porter, Member of the President's Commission on Industrial Competitiveness, quoted in Fortune, April 28, 1986

The Massachusetts Corporation for Educational Telecommunications (MCET), Boston University, and the University of Massachusetts seek federal support for the development of a model educational telecommunications network. Anchored by two Technology Resource Centers located in the eastern and western parts of Massachusetts, this telecommunications network will link primary and secondary schools, colleges and universities, hospitals and libraries, and businesses and industries throughout the state and region to demonstrate how creative use of advanced telecommunications technologies can:

1. Improve educational opportunities for students in primary and secondary schools, particularly in the crucial areas of math, science, and foreign languages,

by offering courses not currently available to them, and by providing continuing professional development programs for primary and secondary school teachers;

2. Promote economic development by providing low cost, accessible, high quality continuing education for the labor force;

3. Facilitate the sharing of information among and between the private and public sectors, and among educational institutions at all levels, through interactive data exchange and teleconferencing; and

4. Facilitate the efficient and cost-effective use of scarce educational resources.

The MCET network will initially provide service to all areas of Massachusetts and is easily expandable to other parts of New England. The proposed telecommunications network will achieve measurable results by:

-- Increasing student access to advanced courses of study;

-- Improving the educational opportunities for students in communities with limited financial resources and access to educational programming;

-- Enhancing the competence of science, mathematics, and foreign language teachers, thereby improving the performance of their students in these subjects;

-- Providing a more highly skilled workforce for high technology industries;

-- Permitting more persons to obtain graduate degrees, particularly in the fields of education and engineering;

-- Helping the public sector and private industries to develop and conduct job training and retraining programs; and

-- Developing a network that will permit the exchange of ideas and information between and among academic institutions and the business community.

A. ADDRESSING THE NEEDS OF PRIMARY AND SECONDARY SCHOOLS

Telecommunications services cannot and should not replace the traditional classroom. However, a telecommunications network can serve as a valuable tool for providing teachers, administrators and students with access to courses and other supplementary programming that would not otherwise be available. For electronically-delivered educational services to be useful, it is essential that they fit into the existing curriculum with little or no disruption and at minimal cost to the schools themselves.

MCET believes its network services for primary and secondary schools must be guided by three fundamental principles:

-- Local Autonomy: The choice of programming and level of participation will be the decision of school faculty and administrators. They are in the best position to judge which programs best suit their needs. MCET will make no effort to impose programming upon local schools.

-- Regional Needs: Schools located in different areas have greatly varying operating budgets, facilities, student demographics, class sizes, and faculty expertise. Some

schools struggle to offer a basic curriculum, while others offer college-level courses to advanced students. Individual or locally grouped schools need to choose or develop programming tailored to their needs.

-- Interaction: Television courses alone cannot fulfill the educational needs of high school students. Interaction between teacher and students and among students is an essential part of the learning experience and must be addressed in the design of a telecommunications network. Interaction is especially important in foreign language classes, which require oral practice by students, and in science and mathematics, where students often have questions about difficult concepts.

The most important needs the telecommunications network will address at the primary and secondary school level are:

(1) Course offerings in science, mathematics, and computer science for advanced students. For example, a high school teacher may find that a few students in a trigonometry course show greater aptitude than other students in the class. While the teacher cannot redesign the course to meet the needs of the advanced students alone, that teacher could determine through the

telecommunications network whether educational software exists that would be appropriate for a self-study program for these students. Through computer technology and with the guidance of the teacher, the advanced students could pursue their interests in trigonometry, gain extra course credit for their study, and perhaps qualify for advanced placement courses in mathematics as they move forward from grade to grade.

(2) Course offerings in subjects that schools are not able to provide on site due to low enrollment or lack of adequately trained faculty. These may include foreign language courses in Arabic, Russian, Chinese, and Japanese as well as advanced courses in traditional languages. It is unlikely that individual school districts will have the expertise or demand on their own to offer such specialized language courses. Interactive telecommunications courses, however, could provide students with specialized language instruction through the MCET network.

(3) The sharing of special programming developed at one school that would meet the needs of other schools. For example, a teacher at a particular high school may have

developed a new software program on the principles of teaching geometry. With the establishment of the MCET network, that software could be made available to mathematics teachers at other institutions for use in supplementing their own course offerings. Such resource sharing would reduce or eliminate duplication of effort.

(4) Expanded access to instructional aids and data resources, such as libraries, databases, and computer software for improving the effectiveness of teachers and administrators. For example, a high school teacher may be seeking information about computerized databases that could be used as an electronic bibliography for students writing papers on high-energy physics. The teacher could access and make available this information through the MCET telecommunications network.

(5) Remedial instruction for the educationally disadvantaged and specialized instruction for physically or mentally challenged students. A teacher of special education could identify available courseware which would augment standard instructional materials.

B. CONTINUING PROFESSIONAL DEVELOPMENT FOR TEACHERS

It is in the best interest of our educational system to provide teachers with challenging opportunities for continuing professional development. At the present time, teachers who wish to upgrade their knowledge and skills often do not have the flexibility, either in terms of their schedules or their finances, to continue their professional education. An interactive telecommunications network will broaden their opportunities by transmitting courses from the state's colleges and universities directly to teachers at their school locations. This will permit them to gain course credits and advanced degrees while teaching full time, avoiding time-consuming and costly travel.

Teachers can also use the telecommunications network to participate in special seminars and teleconferences. When teachers throughout the region are involved in such a seminar or conference, the network will enhance communication and the sharing of ideas among educators from geographically dispersed areas.

The MCET network will also be used as an instantaneous communications system between the state Department of Education and local primary and secondary schools. Special announcements, notices of meetings, and other pertinent information can be

simultaneously distributed to all schools. This will allow educators and administrators to communicate more quickly on matters of education policy and events of particular interest.

Such an electronic link, where necessary and appropriate, can eliminate the need to meet in person and assure more widespread participation. For example, the Commissioner of Education could choose to schedule a one-hour teleconference involving all the schools in the Commonwealth regarding efforts to address the growing problem of drug and alcohol abuse in schools. Participants would be able to see the Commissioner on television monitors located at their schools and would be able to engage directly in questions and answers because of the interactive nature of the network.

C. CONTINUING EDUCATION FOR INDUSTRY

The other significant need to be addressed by the MCET network is the demand for continuing education courses for those employed in engineering, computer science, health services, and other fields characterized by rapid technological change. The market for such courses has been demonstrated by the successful experience of a number of Massachusetts institutions. For example, Northeastern University offered 125 courses to over 750

students at worksites through its Instructional Television Fixed Service (ITFS) system during 1985-1986. Similarly, Boston University has broadcast courses over ITFS by using the Boston Catholic Television facilities, and the University of Massachusetts at Amherst has delivered videotaped instruction to more than 800 students at 100 sites throughout New England.

These institutions and others that currently lack such programs have expressed great interest in the possibilities offered by the MCET network. Through the MCET telecommunications system, they could expand their delivery beyond the limited range of existing ITFS systems, reaching both a larger and more dispersed audience.

The MCET system can offer greater services than are now available. These will include the ability to address programming to particular institutions, the simultaneous transmission of multiple pages of notes, homework assignments, and other data, as well as the opportunity for interactive audio and video communication. Courses can be offered live, as well as on tape.

The Massachusetts Corporation for Educational Telecommunications conducted a survey of 29 major colleges and universities located in the Commonwealth to ascertain the status of their facilities

for such programming and their interest in expanding courses of this nature. Of the institutions surveyed, 19 have in-house video production facilities, three are producing and distributing courses to industrial sites by ITFS in the greater Boston area, and eleven are producing videotapes for distribution by mail to industrial sites. More than two-thirds of those surveyed expressed interest in distributing live video courses or in extending their current distribution.

Table 1 provides a sample of the variety of subject matter, degree of geographical distribution, and level of institutional expertise that would be provided by the MCET network.

Table 1 - Preliminary Listing

SELECTED INSTITUTIONAL EXPERTISE AVAILABLE TO THE TELECOMMUNICATIONS NETWORK

Source	*Location*	*Subjects of Expertise & Specialization*
Boston University	Boston	Computer Sciences, Management, Engineering, Medicine, Communications, Education
Northeastern Univ.	Boston	Engineering, Computer Sciences
Univ. of Mass.	Boston	Extended Education
Univ. of Mass. Medical Center	Worcester	Continuing Medical Education
Univ. of Mass.	Amherst	Engineering, Education, Govt. Services, Polymer Sciences
Berkshire Community College	Pittsfield	Early Childhood Educ., Banking Services
Southeastern Mass. University	N.Dartmouth	Nursing
University of Lowell	Lowell	Engineering, Computer Sciences
Holyoke Community College	Holyoke	Hospitality Management
Babson College	Wellesley	Management, Business Administration
State Dept. of Educ.	Quincy	Teacher Training, Computer Education, Adult Basic Education
Central New England College	Worcester	Computer Sciences
Kennedy School Harvard University	Cambridge	Public Policy Forums
New England Medical Center	Boston	Continuing Medical Education
Board of Library Commissioners	Boston	Adult Literacy Training
Commission for the Blind	Boston	Educational Programs for the Blind
Continuing Education Institute	Medford	High School Equivalency Courses
Growth Opportunity Alliance of Greater Lawrence	Lawrence	Industrial Quality Control
Boston College	Chestnut Hill	Career Information & Counseling
Boston Public Schools	Boston	Professional Development for Teachers
Mass. Photovoltaic Center	Boston	Photovoltaics
MIT	Cambridge	Engineering

Companies throughout the state have already demonstrated a high level of interest in receiving telecourses in continuing professional education. Table 2 provides examples of companies currently receiving such courses.

Table 2. Corporations Interested In Receiving Courses for Continuing Professional Education

Company	Location
Digital Equipment Corp.	7 locations in Greater Boston, Worcester, and Springfield
Wang Labs	2 locations in Greater Boston
Honeywell	2 locations in Greater Boston
Analog Devices	2 locations in Greater Boston
Hewlett-Packard	2 locations in Greater Boston
Raytheon	Greater Boston
M/A-Com	Greater Boston
GTE Greater Boston	
Data General	Greater Boston
AT&TGreater Boston	
Polaroid	Cambridge
IBM	Cambridge
Presmet	Worcester
Monsanto	Springfield
General Electric	Pittsfield
Texas Instruments	Southeastern Massachusetts

The MCET telecommunications network will also make available continuing education for health care professionals. Medicine, like the high technology industry, is a field which is constantly growing, highly specialized, and involves rapidly changing information and technologies. In order to keep up-to-date in their disciplines, medical professionals currently attend seminars and conferences sponsored by major teaching hospitals and health care associations. Given travel, time, and financial constraints, only a small number of health professionals can participate in these events.

The MCET network can carry live or pre-taped programming from the major teaching hospitals and colleges of medicine to health care centers throughout New England. State-of-the-art techniques can be demonstrated to, and learned by, doctors and nurses in any hospital, regardless of size or location. For example, "grand rounds" from a university medical center could be transmitted on a regular basis to affiliated hospitals. Doctors could attend the video seminar at their own hospitals and participate in the discussion through the audioconferencing system.

The MCET network can also be useful in extending the diagnostic expertise of larger hospitals to smaller clinics and hospitals.

Using video and data transmissions, medical specialists can review the cases of patients in remote locations and provide expert diagnoses and treatment. Medical records and test results could be transferred electronically and in confidence between the sites. In addition, use of the network would help the region achieve the important goal of better health care at lower cost.

Furthermore, the MCET network will be able to enhance the skills of professionals by exposing them to courses outside their immediate areas of expertise or responsibility. For example, a management-trainee in a corporation could earn a higher-level degree or enroll in a financial management course that would be of value to both the worker and the company. When these growth opportunities are offered through a telecommunications link, the employees will be able to take advantage of the programming on-site at times least disruptive to the normal conduct of business.

In addition to providing continuing professional education, the MCET network will also offer retraining courses for workers whose jobs are eliminated through automation or other factors. In order to become employable in an increasingly technological world, these workers will need to upgrade their current skills or learn new ones. Moreover, firms installing equipment based

on new technology that requires skilled operators must train or retrain their workers. In this case, the MCET network can transmit appropriate training programs directly to the employees at the worksite.

IV. TECHNOLOGY RESOURCE CENTERS: THE CORNERSTONES OF THE TELECOMMUNICATIONS NETWORK

All high schools, many institutions of higher education, and a number of companies interviewed by the Massachusetts Corporation for Educational Telecommunications expressed a need for information and consultation on the educational uses of a wide variety of new technologies. The availability of computers, video equipment, and transmission capacity, while necessary, is not sufficient in itself to achieve the results envisioned by MCET. Schools and industry must have access to technological expertise in order to develop instructional programming to meet specific demands, to make well informed decisions concerning the purchase of hardware and software, and to apply effectively new technologies to their own needs.

This expertise will be provided by the Technology Resource Centers, operating as an integral part of the MCET network. These Technology Resource Centers will help educational institutions and private enterprises make effective use of the transmission capacity of the MCET network. They will help client institutions and individuals to develop, evaluate, and distribute television programming and computer software.

Through these Centers, institutions will have access to academic and industrial experts in a wide range of disciplines, including telecommunications engineering, instructional technology, computer science, and television production. The Centers will also provide an environment in which educators, technical specialists, and business leaders can work together in devising technological solutions to education and worker training problems.

The two Centers, located in eastern and western Massachusetts, will initially serve primary and secondary schools, higher education and health care institutions and private businesses within the state. Once the Centers prove successful at addressing the needs of Massachusetts institutions, service can be expanded to institutions throughout New England. As use of these Centers increases, similar facilities can be developed in other parts of New England that can more fully serve the particular needs of those states.

Each Technology Resource Center, drawing on its own expertise and the specialized resources of other educational institutions across the Commonwealth, will:

(1) Offer telecommunications consulting services. The Center will assist educational institutions in linking into and making effective use of the MCET network. It will help them plan, implement, and use telecommunications technologies such as satellite communication, Instructional Television Fixed Service (ITFS), and cable television.

(2) Provide consulting services on instructional software and related hardware. Experts at the Technology Resource Centers will provide recommendations to schools, institutions of higher education, and training departments of hospitals and industry, on available computer software and related hardware that will meet specialized needs.

(3) Serve as a distribution site for audio and video programming. Colleges and universities which have developed appropriate software or programming can use the Technology Resource Center for the dissemination of their materials to other institutions or industries participating in the network.

(4) Serve as a test facility where educators and others can try various software packages before purchase. Educational and administrative software will be available for use on a loan, purchase, lease, or barter basis.

(5) Be a center for problem solving. Institutions affiliated with the MCET network can bring specific educational and economic development problems to the attention of the Technology Resource Centers. The Centers will, in turn, bring together experts in relevant disciplines at academic institutions and in the private sector who can collaborate on developing solutions to the problems.

(6) Be a library, housing a wide variety of video resources, and materials on communications technology.

(7) Serve as a link to national and international databases, enabling schools and industry to access material at reduced rates.

(8) Function as a laboratory for the development of new software, video programming, and databases. The Centers

will design computer programs for specific educational or industrial use, and assist those who wish to develop their own software or other programming.

(9) Serve as a site for teleconferencing and as a clearinghouse for electronic mail.

The initial Technology Resource Centers will be located at Boston University and the University of Massachusetts at Amherst. These universities were chosen because they are major research and learning institutions, and because of their strategic locations in eastern and western Massachusetts. Each has significant strengths that complement one another, and their combined resources will provide the expertise needed in all subject areas relevant to the mission of the network.

Boston University was selected as the appropriate location in the eastern part of the state because it is the only Greater Boston institution with Schools of Engineering, Education, Health Sciences (Medicine, Dentistry, Public Health, Nursing and Allied Health Professions), and Communication. These assets uniquely suit the needs of the MCET network. Boston University will be able to provide expert assistance in such fields as:

(1) Engineering: Boston University will draw upon the faculty and resources of its School of Engineering to develop continuing education programs for professionals and advanced courses for engineering students at other colleges and universities lacking the same level of expertise.

(2) Education: Boston University will employ its School of Education, Metropolitan College, and College of Communication to develop and disseminate courseware and computer-assisted instructional materials to teachers and students.

(3) Health Services: Boston University, through its Medical Center and its School of Medicine's Technology Transfer Program, will distribute information about biomedical research and other materials relevant to health professionals, students, and organizations.

(4) Specialized Databases: Boston University will provide access to the databases constructed by its Human Resources Policy Institute, its Center for Technology and Policy, its Regional Institute on Employment Policy, and other of its affiliates. These databases contain

demographic and economic data, materials on emerging technologies, and other information which is not yet widely available or easily obtained.

(5) Basic Education: Boston University's College of Communication and School of Education will develop and disseminate through the network software appropriate for use in remedial reading and writing courses designed to improve the literacy of both students and workers. Boston University already operates a nationally recognized adult literacy program based in communities near its campus.

(6) Economic Development: Boston University will draw upon the expertise of its School of Management to provide assistance to industries and offer courses to educational institutions concerning emerging economic trends, management techniques, and related issues.

(7) Communications Technology: Boston University will draw upon the resources of its College of Communication and School of Education, as well as the strengths of its

College of Engineerings to develop educational materials and courseware to assist teachers and students in learning how to use the communications technology resources available to them.

The University of Massachusetts at Amherst was selected as the location for the western Technology Resource Center because it is the only institution in western Massachusetts that includes Schools of Education, Management, Engineering, Public Health, and Food & Natural Resources. In addition, it sponsors the Small Business Development Center, the Center for Economic Development, and the Center for Rural Massachusetts. The University will draw upon these unique resources to provide assistance in the following areas:

(1) Engineering: The University will serve as a resource in the areas of electrical engineering, computer engineering, materials science, and civil engineering. The University already has in place a videotape instruction program for M.S. and Ph.D. candidates in Electrical and Computer Engineering through its Extended Engineering Program.

(2) Computer Technology: The Division of Continuing Education offers a wide range of expertise and courses in the areas of basic computer literacy, teacher training and computer applications both for beginning and advanced students.

(3) International Trade: The University offers courses in international marketing and foreign relations which will be of particular interest to Massachusetts companies seeking to expand their export markets abroad, and to students who wish to pursue careers in this field.

(4) Specialized Databases: The University offers specialized databases such as the Nutritional Databank of the College of Food & Natural Resources, UMASS Answers, and the computerized resources of its Small Business Development Center.

(5) Small Business: Drawing the resources of its School of Management, in coordination with the Small Business Development Center and the Center for Economic Development, the University will offer educational and

technical assistance programs designed to meet the needs of small businesses and students who expect to pursue careers in small business.

(6) Public Health: Through its School of Public Health, the University will offer research findings, technical assistance, and instructional materials relevant to health professionals, students, and organizations concerned with public health.

(7) Agriculture: The University will draw upon the resources of its College of Food and Natural Resources to provide research findings, technical assistance, and instructional materials on such subjects as public resource planning, agricultural production, the food industry, and natural resource conservation.

Through these Technology Resource Centers, the Massachusetts Corporation for Educational Telecommunications will facilitate the sharing of the state's many informational resources with institutions and businesses throughout Massachusetts and New England to address the region's significant educational and economic needs.

V. THE TELECOMMUNICATIONS NETWORK: A TECHNICAL DESIGN

The Massachusetts Corporation for Educational Telecommunications has designed a statewide network to meet the following goals:

(1) From the inception of service, the network will be capable of reaching all educational and industrial sites in the Commonwealth, regardless of their geographical location or topographical characteristics;

(2) The design will permit easy extension of the network to all parts of New England;

(3) The network will be affordable to operate and maintain;

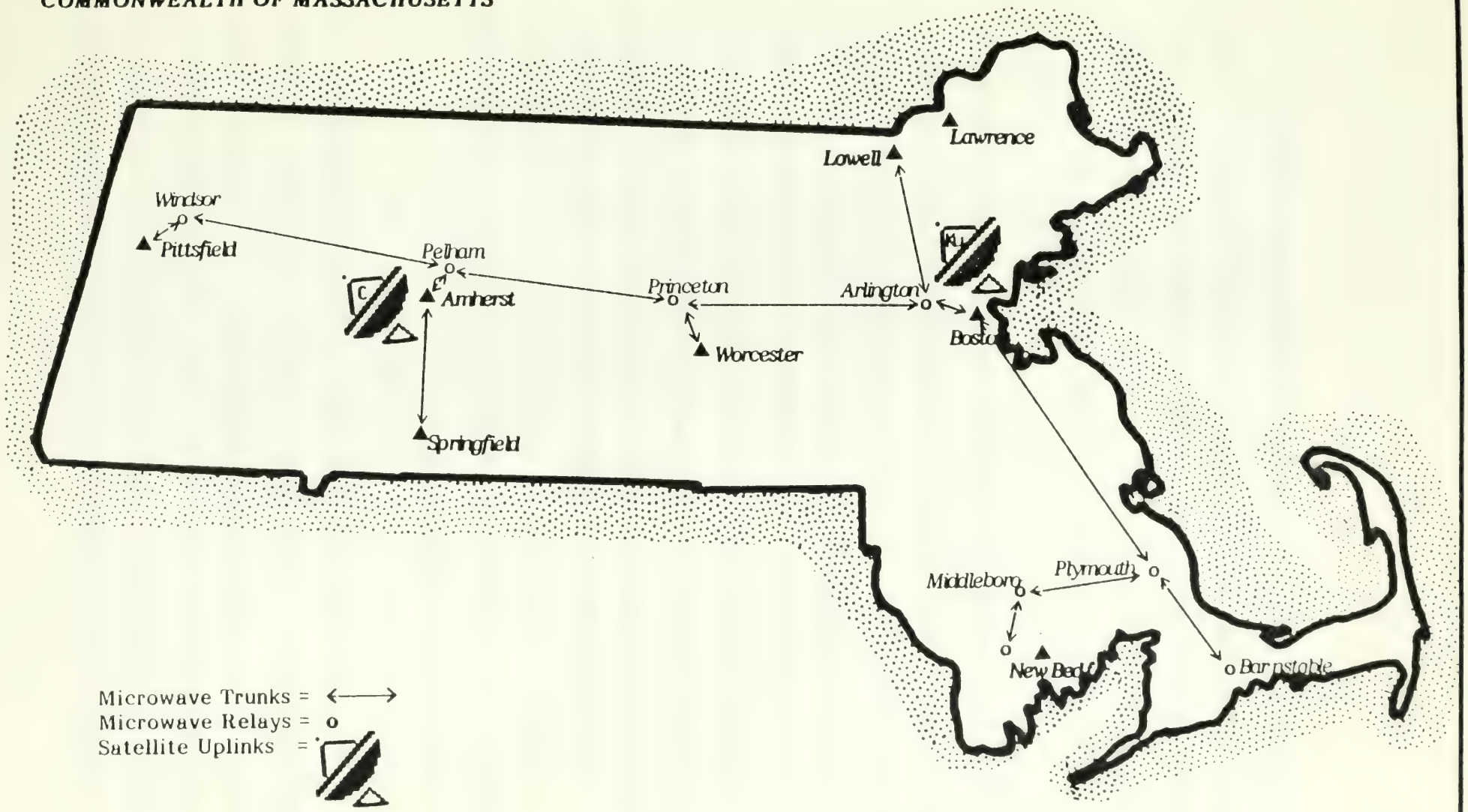
(4) The network's transmission capacity will be adequate to meet initial communications needs and easily expandable to meet future increased demand; and

(5) The network will be capable of providing addressable, two-way interactive services through television, voice and data communication.

To meet these goals, MCET has designed a network that uses an innovative combination of terrestrial and satellite-based technologies. (Figure 1 provides a simplified illustration of

Figure 1

COMMONWEALTH OF MASSACHUSETTS



CORPORATION FOR EDUCATIONAL TELECOMMUNICATIONS

the system design.) When fully activated, the network will serve as a comprehensive electronic system of "roadways" capable of carrying state-of-the-art television, data, and audio educational services to schools, institutions of higher learning, worksites, and homes throughout the state.

A highly advanced satellite communications system, capable of two-way communication, will serve as the basic distribution vehicle of the network. Unaffected by hills and buildings that often block terrestrial telecommunications systems, the satellite system will use uplinking facilities in Boston and Amherst to transmit programming to every Massachusetts school district, to industrial sites, colleges and universities, and to health care facilities across the Commonwealth. Because satellite technology transmits to very wide geographic areas, distribution can be easily extended to all of New England by placing inexpensive receive dishes at locations that wish to become part of the network.

MCET proposes to provide each of the approximately 270 Massachusetts public school districts with basic satellite receive dishes. In the many communities where local cable systems already extend to all schools, distribution from the satellite receive dish can be accomplished over local public, educational and governmental cable television access channels.

In those communities where cable does not extend to schools, the school building where the satellite receive site is located for that district will serve as a central location for MCET network programming.

This system will enable local schools to supplement classroom instruction with educational services that are often too expensive for individual districts to afford. Such programming will include laboratory simulations, and low-enrollment and advanced courses in such subjects as higher-level mathematics, applied sciences, computer education and languages like Russian, Chinese, and Arabic. These services will be provided with a low-cost audio return signal over telephone lines. The satellite system will also enable local teachers to participate in continuing professional education video courses.

MCET also will place two-way satellite receive-transmit earth stations at approximately 50 "magnet" educational centers across the state. These stations will enable area students and faculty to receive simultaneous video and data transmissions and to interact with other sites by sending back a slow-scan video signal or up to 256 kilobits of data. The magnet educational centers will be capable of participating in sophisticated computer-aided instruction, further augmenting the educational opportunities and options available at the local level. Two-way

satellite technology will permit local students to draw on the data banks and library resources of major universities and the largest cities of the Commonwealth. At the same time, it will enable industrial sites which invest in either the basic receive-only earth stations or the two-way earth stations to participate in a wide range of continuing education courses, or to interact with academic researchers and scientists.

A two-way satellite network is easily expandable to institutions throughout the New England region and the nation. Unlike other forms of two-way communication, the cost of adding institutions to the satellite-based network and the on-going operational costs are the same regardless of whether institutions are located within the state, in other parts of the region or across the nation. It will be possible through this technology for institutions throughout New England to communicate with each other, as well as with major research organizations, supercomputers or other locations nationwide.

The second basic element of MCET's network concept is a terrestrial microwave spine or "turnpike" capable of transporting programming to the satellite-based program distribution system, connecting the eastern and western Technology Resource Centers, and linking the major population

and institutional centers of the state. An east-west microwave spine will connect Boston in eastern Massachusetts to Worcester in the center of the state and to Springfield, Amherst, and Pittsfield in western Massachusetts. A north-south microwave spine will extend from the Lowell-Lawrence region near the New Hampshire border to Boston, to Plymouth on the South Shore of Massachusetts Bay, to Barnstable on Cape Cod, and to the Fall River/New Bedford area near the Rhode Island border.

The two microwave spines will be capable of carrying four two-way television channels and substantial audio and data signals. They will provide accessible "insert points" at which institutions can transmit data and full motion video programming to the statewide network. The spines will have adequate bandwidth to accommodate medium to high speed data transmissions and voice services through the use of microwave channel subcarriers, vertical blanking interval (VBI) data transmission, and related technologies.

Like the satellite portions of the MCET network, the microwave system is expandable to reach other areas of New England to permit program origination, two-way videoconferencing and high-speed data communication by New England institutions. The Fall River/New Bedford branch of the microwave network, for

instance, can easily be extended to reach the major educational institutions in the Providence, Rhode Island, area. Likewise, the Lowell/Lawrence microwave link can be extended to the University of New Hampshire and the high technology centers of southern New Hampshrie.

Appendix 5 provides a detailed description of the proposed satellite and microwave systems. MCET will continue to monitor developments in communication technologies, particularly in the area of fiber optic transmission, for possible inclusion in the network where cost effective.

VI. MASSACHUSETTS AND NEW ENGLAND: AN IDEAL LOCATION FOR A NATIONAL DEMONSTRATION OF EDUCATIONAL TELECOMMUNICATIONS

Massachusetts and the New England region are ideal locations in which to develop a national demonstration of an advanced, regional educational telecommunications network and accompanying university-based technology resource centers.

The area is representative of other regions of the country in many respects: it has both aging, traditional industries and emerging, high technology industries; cities and suburbs of great affluence and depressed urban and rural areas; an extraordinarily diverse population base; and wide disparities in educational and employment opportunities for young people. Indeed, the New England region can be considered a microcosm of our nation and the future direction in which it is headed.

The following are some of the characteristics which make Massachusetts and the New England region a particularly appropriate place in which to demonstrate the feasibility and effectiveness of large-scale educational telecommunications:

-- The New England region has a heavy concentration of decaying, capital-intensive smokestack industries which have been hard hit by foreign competition. As some of

these industries make efforts to retool, their workers need to be retrained in the use of new, high technology equipment and processes. Workers who have lost their jobs in these industries similarly need retraining to allow them to compete for newly created jobs in the high technology sector. Extensive vocational education programming by colleges and universities is needed to meet these needs.

-- In recent years, the high technology industry has established itself and thrived in the New England region and, particularly, in Massachusetts. This industry's rapid growth and its effect on the local economy is a harbinger of the future impact of high tech on our nation's economy. The high technology industry needs great amounts of human capital -- scientists and engineers -- to compete effectively against fierce and often government-subsidized international competition. A large investment must be made in educational resources and in improving the quality of education to keep the knowledge-intensive, U.S. high tech industry a world leader. The high tech industry in New England is committed to working with schools and universities to make such an investment and has identified educational

telecommunications as a priority in this effort. Many firms are either already receiving programming from individual universities with existing, limited-scale networks or have expressed strong interest in receiving programming over a regional netowrk developed by MCET.

-- The New England region and, particularly, Massachusetts, have an extraordinarily high concentration of educational resources upon which to draw -- nationally and internationally respected public and private colleges and universities, leading medical centers, and progressive elementary and secondary education programs. Many of these institutions have expressed strong interest in receiving and distributing programming over a regional network developed by MCET.

-- A number of institutions of higher education in Massachusetts, including Boston University, the University of Massachusetts, Northeastern University and the University of Lowell are already using limited-scale telecommunications systems to deliver educational services to other colleges and universities, elementary and secondary schools, and worksites in their general vicinities. This experience gives Massachusetts a firm

foundation and an important head start in the development of the nation's first comprehensive, region-wide advanced educational telecommunications system.

-- Massachusetts is a strong advocate of the comprehensive use of educational telecommunications. In 1982, the State Legislature enacted a law establishing the Massachusetts Corporation for Educational Telecommunications (MCET). MCET was charged with developing a comprehensive, multi-purpose, statewide educational telecommunications system connecting all elementary, secondary and post-secondary educational institutions and such other institutions as medical centers, businesses and libraries. The Governor and legislative leadership of Massachusetts have expressed strong support for the network proposed by MCET.

-- In the spring of 1986, MCET designed a regional educational telecommunications system capable of electronically linking and distributing programming to institutions and worksites throughout Massachusetts and the New England region. The system uses an innovative combination of state-of-the-art satellite and microwave technology supported by unversity-based Technology

Resource Centers. The proposed MCET network would be the nation's first comprehensive, multi-purpose, regional educational telecommunications system.

-- The MCET regional network concept has been endorsed by public and private colleges and universities, elementary and secondary school districts and educational collaboratives, public libraries, hospitals, local governments, teachers organizations, and many private businesses. The Commonwealth of Massachusetts has provided major financial support for MCET's operational and planning activities. Additional financial support and in-kind contributions have been provided by Boston University and the University of Massachusetts.

For these reasons, MCET is confident that it can establish a model regional educational telecommunications network in New England which will successfully demonstrate the feasibility of a large-scale network and accompanying state-of-the-art technology. MCET anticipates that its educational telecommunications system will be replicated in other regions of the nation which are seeking to maximize their educational resources, modernize their classrooms, improve the skills of their students, and retrain their workers.

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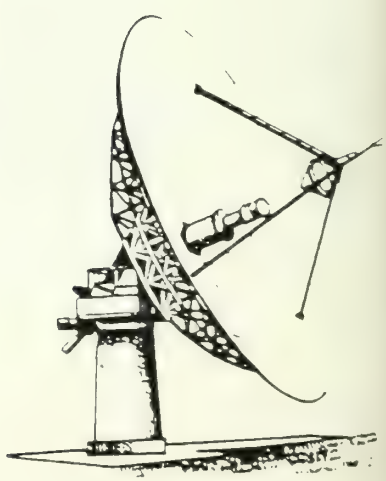
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APPENDIX 1

Enabling Legislation Creating the
Massachusetts Corporation
for Educational Telecommunications



THE COMMONWEALTH OF MASSACHUSETTS

1982 ACTS AND RESOLVES - APPROVED DECEMBER 23, 1982

MICHAEL JOSEPH CONNOLLY, SECRETARY OF STATE

Chap. 560. AN ACT CREATING THE MASSACHUSETTS CORPORATION FOR EDUCATIONAL TELECOMMUNICATIONS.

Whereas, The deferred operation of this act would tend to defeat its purpose, which is to provide immediately for the establishment of a statewide, multipurpose, educational telecommunications network in the commonwealth, therefore it is hereby declared to be an emergency law, necessary for the immediate preservation of the public convenience.

Be it enacted, etc., as follows:

SECTION 1. Purpose. It is hereby found and declared that:-

The commonwealth is lagging behind other states in utilizing development in telecommunications technology in order to solve educational, health and human services, and manpower problems, to facilitate cooperation among public and private institutions, and to make education and information more accessible to the citizens of the commonwealth.

There is an urgent need to link private and public post-secondary educational institutions, school systems, libraries, and health institutions in the commonwealth to the many potential users of telecommunications by the establishment of a statewide, electronic, multisystem, multipurpose telecommunications network. Such a network would encourage and facilitate economies of scale and complementarity among such entities by providing a direct communication link for education, information, and data resource sharing; provide a means of delivering education and information to the home and community; contribute substantially to enlarging the pool of trained manpower essential to the economy of the commonwealth by connecting educational institutions to public and private worksites; and effect cost savings and improvements in the many non-instructional applications of telecommunications.

Therefore, it is found that it is in the public interest to promote the education, prosperity and general welfare of its citizens, a public purpose for which public money may be expended, by creating the Massachusetts Corporation for Educational Telecommunications to establish and operate a statewide telecommunications network to meet the educational and informational needs of business, industry, government, and the inhabitants of the commonwealth.

SECTION 2. The following terms as used in this act shall

have the following meaning, except where the context clearly indicates otherwise:

"Board", the board of directors of the Massachusetts Corporation for Educational Telecommunications.

"Network", the statewide educational telecommunications network to be established by the Massachusetts Corporation for Educational Telecommunications pursuant to the provisions of this act.

"Corporation", the Massachusetts Corporation for Educational Telecommunications.

"Current expenses", as applied to the network or any portion thereof established pursuant to the provisions of this act, the amount of reasonable and necessary expenses for the administration and operation of the network after it has become operational.

"Project cost", as applied to the network or any portion thereof created pursuant to the provisions of this act, embraces all or any part of the cost of construction, acquisition, alteration, enlargement, reconstruction, and remodeling of the network, including all lands, structures, real or personal property, rights, rights of way, air rights, franchises, easements and interests acquired or used in connection with the network, the cost of demolishing or removing any buildings or structures on land so acquired, including the cost of acquiring any lands to which such buildings or structures may be moved, financing charges, interest prior to, during, and for a period after completion of such construction and acquisition, amounts reasonably required to make the network operational, the cost of architectural, engineering, financial and legal services, plans, specifications, studies, surveys, estimates of costs and revenues, administrative expenses, expenses necessary or incident to determining the feasibility or practicability of constructing the network and such other expenses as may be necessary or incident to the construction and acquisition of the network.

"Start-up expenses", as applied to the network or any portion thereof created pursuant to the provisions of this act embraces all or part of the expenses for the administration and operation of the network incurred in the establishment of the network prior to the time the network becomes operational.

SECTION 3. There is hereby created a body, politic and corporate, to be known as the Massachusetts Corporation for Educational Telecommunications, hereinafter referred to as MCET. MCET is hereby constituted a public instrumentality of the commonwealth and the exercise by MCET of the powers conferred in this act shall be deemed and held to be the performance of an essential public function. MCET is hereby placed in the University of Massachusetts but shall not be subject to the supervision or control of said university or of any board, bureau, department, office, or any agency or officer of the commonwealth except as specifically provided in this act.

MCET shall be governed and its powers exercised by a board of directors which shall consist of eighteen directors and shall be representative of the racial, ethnic and cultural diversity of the commonwealth, the secretary of economic development and manpower affairs, the commissioner of the department of education, the chancellor of the board of regents of higher education, the president of the University of Massachusetts, the president of WGBH Educational Foundation, the chairman of the advisory council to MCET and twelve persons appointed by the governor, three of whom shall be presidents of private institutions of higher education in the commonwealth, one of whom shall be the president of a Massachusetts state college, one of whom shall be the president of a Massachusetts community college, two of whom shall be representatives of the Massachusetts Municipal Association, one of whom shall be the superintendent of a kindergarten through twelfth grade local public school district in the commonwealth and four of whom shall be bona fide representatives of other major sectors significantly affected by MCET. Each member appointed by the governor shall serve for a term of seven years and thereafter until his or her successor is appointed, except that in making the initial appointments the governor shall appoint one member to serve for two years, two to serve for three years, two to serve for four years, two to serve for five years, two to serve for six years and two to serve for seven years. Any person appointed to fill a vacancy in the office of a member of the board shall be appointed in a like manner and shall serve for the remainder of the unexpired term. Any appointed member shall be eligible for reappointment, and may be removed from his or her appointment by the governor for cause. Nine directors shall constitute a quorum and the affirmative vote of a majority of the directors present and eligible to vote shall be necessary for any action to be taken by the board. The directors shall serve without compensation, but shall be entitled to reimbursement for actual and necessary expenses incurred in the performance of their duties. The board shall meet no less than four times in each year, and shall have final authority over the activities of MCET.

The board shall annually elect from among its members a chairman and vice-chairman. The board shall also designate a secretary and treasurer who need not be members of the board. The secretary shall keep a record of the proceedings of the corporation and shall be custodian of all books, documents, and papers filed with the corporation, and its official seal. The secretary shall cause copies to be made of all minutes and other records and documents of the corporation and shall certify that such copies are true copies and all persons dealing with the corporation may rely upon such certification. The treasurer shall be chief financial and accounting officer of the corporation and shall be in charge of its funds, books of account and accounting records.

The board shall hire an executive director and establish his

salary. The executive director shall be the chief administrative and operational officer of the corporation and shall direct and supervise its administrative affairs and general management. The executive director shall attend meetings of the board and may, subject to the general supervision of the board, employ other employees, consultants, and agents, including counsel and advisors.

Neither the corporation nor any of its officers, directors, agents, employees, consultants or advisors shall be subject to the provisions of sections nine A, forty-five, forty-six and fifty-two of chapter thirty, chapter thirty-one, or section twenty-seven and sections twenty-seven A to twenty-seven F, inclusive, of chapter one hundred and forty-nine of the General Laws; provided, that in purchasing products or services, the corporation shall at all times follow generally accepted good business practices.

The provisions of chapter two hundred and sixty-eight A of the General Laws shall apply to all directors, officers, and employees of the corporation except that the corporation may purchase from, sell to, borrow from, contract with or otherwise deal with any organization in which any director of the corporation is in any way interested or involved; provided, however, that such interest or involvement is disclosed in advance to the directors and recorded in the minutes of the proceedings of the corporation; and provided, further, that no director having such an interest or involvement may participate in any decision relating to such organization.

All officers and employees of the corporation having access to its cash or negotiable securities shall give bond to the corporation at its expense, in such amount and with such surety as the board may prescribe. The persons required to give bond may be included in one or more blanket or scheduled bonds. The board may purchase liability insurance for directors, officers and employees, and may indemnify said persons against the claims of others.

There shall be an advisory council to MCET, which shall consist of no more than twenty-six members appointed by the governor for terms of seven years who shall be broadly representative of potential providers and users of said network and who are not otherwise represented on the board of directors of MCET. The council shall meet no less than three times a year and shall annually elect a chairman from among its membership.

SECTION 4. MCET shall have the following powers:-

(a) to make, amend, and repeal by-laws, rules and regulations, and policies for the management of its affairs and the operation of the network, including the regulation of network use and program content; provided that said rules, regulations and policies shall demonstrate, both in text and in application, a firm commitment to the promotion of equal access to MCET services by racial and ethnic communities;

(b) to adopt an official seal;

(c) to sue and be sued, in its own name;

(d) to develop, operate, and maintain a statewide, electronic, multisystem, multipurpose telecommunications network providing educational and information services and utilizing available and successor telecommunications technologies, which may include, but need not be limited to, leased lines, satellite systems, instructional television fixed service or multipoint distribution service systems, land lines, and a point-to-point microwave system, or any combination thereof;

(e) to encourage the use of said network by providing post-secondary institutions and other entities assistance in the development and production of educational and informational programming which meets the educational, cultural and economic needs of the entire population of the commonwealth; provided, however, that MCET shall not be authorized to produce such programs;

(f) to acquire, own, hold, lease, rent, dispose of and encumber real and personal property of any nature or any interest therein in the exercise of its powers and performance of its duties under this act;

(g) to enter into agreements or transactions with any federal, state or municipal agency or other public institution or with any private individual, partnership, firm, corporation, association or other entity;

(h) to appoint officers, employers, consultants, agents and advisors and fix their compensation;

(i) to appear in its own behalf before boards, commissions, courts, departments, or other agencies of federal, state or municipal government;

(j) to procure insurance against any losses in connection with its property in such amounts, and from such insurers, as may be necessary or desirable;

(k) to apply for, accept, hold, use, and dispose of any and all donations, grants, bequests, and devises, conditional or otherwise, of money, property, services, or other things of value which may be received from the United States or any agency thereof, any governmental agency, any institution, person, firm or corporation, public and private, such donations, grants, bequests and devises to be applied for, accepted, held, used or disposed of for any and all of the purposes specified in this act and in accordance with any terms and conditions thereof. Receipt of each such donation or grant shall be detailed in the annual report of the corporation, which shall include the identity of the donor or lender, the nature of the transaction and any conditions attaching thereto;

(l) to fix and revise from time to time, charge, and collect rates, rents, fees and charges for the use of or access to the telecommunications network described herein or any portion thereof;

(m) to invest any funds held in reserves or sinking funds, or any funds not required for immediate disbursement, in such

investments as may be lawful for fiduciaries in the commonwealth;

(n) to borrow money;

(o) to exercise any other powers of a corporation organized under chapter one hundred and fifty-six B of the General Laws; and

(p) to do any and all things necessary or convenient to carry out the purposes of this act.

SECTION 5. (a) There is hereby established a fund for carrying out the purposes of this act, hereinafter referred to as the Telecommunications Fund, to which shall be credited any appropriations authorized by the general court specifically designated to be credited to MCET.

(b) The corporation shall hold the telecommunications fund in an account or accounts separate from other funds. All appropriations, grants and other funds received by the corporation and not specifically designated to be credited to the telecommunications fund, including all fees and charges collected by the corporation, and the proceeds of all investments, may be used to pay for the proper general expenses of the corporation.

(c) Unless otherwise specified, all moneys of the corporation from whatever source derived shall be paid to the treasurer of the corporation. Said moneys shall be deposited in the first instance by the treasurer in one or more national banks, trust companies or banking companies in compliance with section thirty-four of chapter twenty-nine of the General Laws. Funds in such accounts shall be paid out on the warrant or other order of the treasurer of the corporation or of such other person or persons as the board may authorize to execute such warrant or warrants.

(d) The corporation shall draw upon the principal and income of the telecommunications fund to meet the start-up expenses and project costs of establishing and operating the statewide telecommunications network described in this act, provided that the corporation shall not utilize the principal of the Telecommuncations Fund to support current expenses of the network.

SECTION 6. The corporation annually shall submit a complete and detailed report of its activities within ninety days after the end of its fiscal year to the clerk of the house of representatives and to the clerk of the senate.

SECTION 7. The books and records of the corporation shall be subject to an annual audit by the auditor of the commonwealth.

SECTION 8. The corporation shall establish a network, and take any and all actions necessary or appropriate thereto, including disbursing available funds from the Telecommunications Fund to meet the project costs and start-up expenses of such a network, only after:

(a) formulation of a detailed plan for the creation and operation of such a network; provided, that the plan shall be

supported by independently verifiable information; and provided, further, that the plan shall include but not be limited to:

(1) a detailed description of the proposed network, including an analysis of lands, structures, facilities, machinery and equipment reasonably necessary for the successful operation thereof; an analysis of the feasibility of using surplus state real property for such a network; and a statement of the proposed project costs reasonably associated with the establishment of such a network, with a detailed breakdown of such project costs, including the estimate of the cost to the commonwealth of the debt service on any bonds or notes issued or to be issued in support of such a network;

(2) a statement of the proposed annual start-up expenses, project costs and current expenses of the network for the first five years of its existence, including a detailed breakdown of such costs and expenses, with a reasonable projection of said costs and expenses which the corporation expects to meet through assistance provided by rates, rents, fees, and charges imposed upon users and support from any other source; and

(3) a description of the public benefits to be engendered by the network, including particularly an analysis of increased and enhanced employment and educational opportunities;

(4) a description of the proposed activities of the network, including the proposed utilization thereof by participating businesses and institutions;

(5) a proposal for capital outlay appropriation from the commonwealth in support of the establishment of the network and such annual maintenance appropriations as may reasonably be required for the successful operation of the network; and

(b) the board has approved the establishment of the network described in the plan, having found and incorporated in its minutes that:

(1) the network as proposed in the plan will substantially further the basic purpose of this act to provide for the establishment and operation of a statewide educational telecommunications network that would facilitate the delivery of education and information among such institutions of learning as public and private higher education, the schools, libraries, cultural and health institutions, and public and corporate learning centers, and between these institutions of learning and the public;

(2) there is no reasonable expectation that the network proposed will duplicate the actual or proposed facilities or programs of institutions or consortia of institutions located within the commonwealth, or, to the extent that a possibility for such duplication may be found to exist, the network as proposed in the plan may reasonably be characterized as enhancing or supplementing the ability of such an institution or consortium of institutions to conduct such actual or proposed facilities or programs;

(3) the establishment or operation of the network as proposed

in the plan are beyond the financial means of any single institution or consortium of institutions located in the commonwealth, either because the capital costs or operating costs associated therewith are prohibitive or because the capital costs or operating costs associated with maintaining such a network at a level consistent with developing technology are prohibitive; and

(c) submission by the board of the plan and findings formulated pursuant to this section to the governor, the president of the senate and the speaker of the house of representatives, the chairman of the senate committee on ways and means and the chairman of the house committee on ways and means.

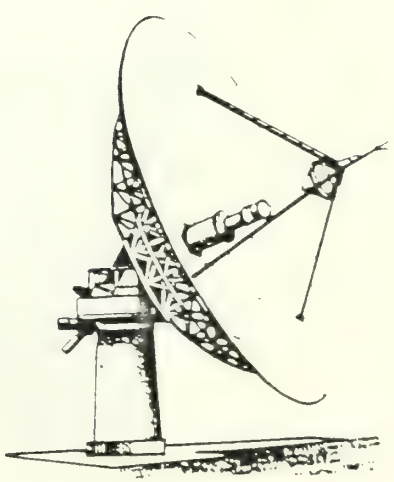
SECTION 9. No monies shall be credited to the Telecommunications Fund in support of the network unless and until the plan and findings required pursuant to section seven of this act have been received and approved in writing by the house and senate committees on ways and means.

Approved December 23, 1982.

APPENDIX 2

Background

The Massachusetts Corporation for Educational Telecommunications



BACKGROUND ON MCET

The Massachusetts Corporation for Educational Telecommunications (MCET) was created in December 1982 by the Massachusetts legislature. The Corporation's creation was a result of the recommendations of an ad hoc study commission formed by the President of the University of Massachusetts, David C. Knapp. The Commission, comprised of leading representatives of the academic, high technology, business and public education communities, found that the Commonwealth of Massachusetts was lagging behind most other states in its approach to meeting the expanding needs for telecommunications capacity to enhance the educational and economic environment.

The Commission recommended the creation of a quasi-public corporation that would be charged with the development of a multi-purpose telecommunications network for the delivery of audio, video and data communications to homes, worksites, schools, health care and other non-profit institutions. Chapter 560 of the Acts of 1982 created the corporation to be known as the Massachusetts Corporation for Educational Telecommunications (MCET), charged with meeting the

> urgent need to link private and public post-secondary educational institutions, school systems, libraries, and health systems in the Commonwealth to the many potential users of telecommunications by the establishment of a statewide, electronic, multisystem, multipurpose telecommunications network.

The purpose of the network is to

> encourage economies of scale and complementarity among such entities by providing a direct communication link for education, information and data resource sharing; provide a means for delivering education and information to the home and community; contribute substantially to enlarging the pools of trained manpower essential to the economy of the Commonwealth by connecting educational institutions to public and private worksites; and effect cost savings and improvements in the many non-instructional applications of telecommunications.

MCET is governed by a Board of Directors, consisting of eighteen positions including the Secretary of Economic and Manpower Affairs, the Commissioner of the Department of Education, the Chancellor of the Board of Regents of Higher Education, the President of the WGBH Educational Foundation and the Chairman of the Advisory Council to MCET. Additionally, the Governor appoints to the MCET Board three presidents of private institutions of higher education, one state college president, two municipal representatives, a public school superintendent and four representatives of other major sectors significantly affected by MCET. The original eighteen members of the MCET Board were appointed in January 1983. After several months of administrative preparation, the Board hired the corporation's Executive Director in November 1983.

During MCET's first year of operation, the staff undertook three major studies:

-- An analysis of existing common carrier and proprietary communications capacity in Massachusetts to determine the extent to which such capacity would be available for use as part of the network;

-- An identification and survey of telecommunications systems throughout the United States that provide services similar to those envisioned for MCET in its enabling legislation; and

-- A uses and needs assessment of a selected sample of Massachusetts institutions to systematically analyze the patterns of existing communications activities and assess which activities could be carried out more efficiently or effectively if a telecommunications network were used.

As a result of those first year efforts MCET developed a preliminary plan for the development of the network envisioned by the Knapp Commission and the Legislature. That draft plan is the basic concept around which this federal proposal was built.

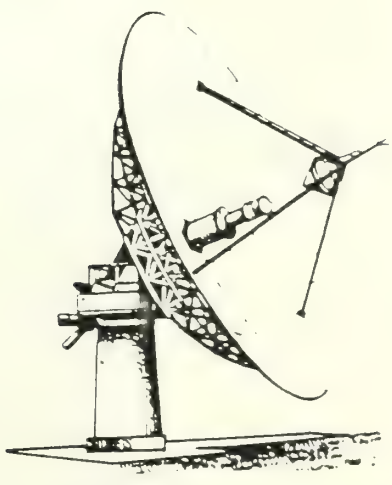
Since its creation MCET has worked with a number of the Commonwealth's institutions, assisting them in the development of proposals for telecommunications services, and in the production of pilot projects that test various telecommunications technologies and systems. For example, MCET has initiated a joint effort between the University of Massachusetts, Boston University and MCET to acquire a state-of-the-art satellite uplinking facility in western Massachusetts. MCET has also been working with Southeastern Massachusetts University in the development of Instructional Television Fixed Service for southeastern Massachusetts and Cape Cod.

APPENDIX 3

Corporation for Educational Telecommunications

Board of Directors

Staff and Consulting Team



THE COMMONWEALTH OF MASSACHUSETTS

CORPORATION FOR EDUCATIONAL TELECOMMUNICATIONS

McCormack Building / One Ashburton Place / Boston, MA 02108 / (617) 727-6286

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Justice, Superior Court of Massachusetts

Richard A. Borten
Executive Director

Charles W. Smith
Treasurer

James E. Samels, Esq.
Secretary

* *denotes Executive Committee Members*

MCET Staff

RICHARD A. BORTEN, Executive Director, was appointed in November 1983. He had most recently served as the administrator of the City of Boston's cable television development process and as a consultant on telecommunications development to numerous other cities and foreign governments.

Mr. Borten has also served as director of both the City of Boston's and Commonwealth of Massachusetts' consumer protection agencies, Associate Professor of Consumer Law at Boston University, and as a newspaper columnist. Mr. Borten was educated at Cornell and Fordham Universities. He lives in Swampscott with his wife and three children.

RUTH A. FERGUSON, Deputy Director, was appointed in December of 1983. She previously worked with the Warner-Amex Cable Communications Company in an administrative and planning role, and on the staff of the Massachusetts House of Representatives. Ms. Ferguson holds an B.A. degree from Cornell University and an MBA degree from Boston University.

RUTH A. BALLINGER, Administrative Coordinator, joined the MCET staff in October 1984. She previously managed the Media Center at Harvard University's Kennedy School of Government. Ms. Ballinger holds a bachelor's degree in economics from Harvard University.

MARTIN G. KESSEL, Research Manager, joined MCET in January of 1984. Mr. Kessel was founder and president of the Cable Television Access Coalition and serves as a Trustee of the Boston Community Access and Programming Foundation. He holds a degree in mathematics from Brandeis University and a master's degree from Boston University's School of Public Communication.

ABBIE R. GOODMAN, Institutional Projects Manager, began working with MCET in January 1984. She formerly served on the cable communications staffs of the City of Boston and the City of Pittsburgh. Ms. Goodman holds a degree in communications from Chatham College.

LINDA DiROCCO, Director of Programming, joined MCET in October 1985. She most recently served as Director and Executive Producer for Television Projects at the Cultural Education Collaborative in Boston. She was founder and president of Somerville Community Access Television, and serves as the Chair of the Cable Television Advisory Board for Mayor Eugene Brune.

Consultants

DR. LEE SELWYN, President, Economics and Technology, Inc., advises MCET on tariff and licensing questions. A leading expert on telecommunications regulation, Dr. Selwyn holds a master's and doctoral degrees from MIT.

LYNN WICKWIRE, President, Wickwire Associates, consults on telecommunications issues. Mr. Wickwire was vice president for corporate development of Rogers Cablesystems and Times Mirror Cable Television. He previously served as executive director of the New York State Commission on Cable Television and chairman of the Governor's Task Force on Cable Television. Mr. Wickwire received a master's of city planning degree from Yale.

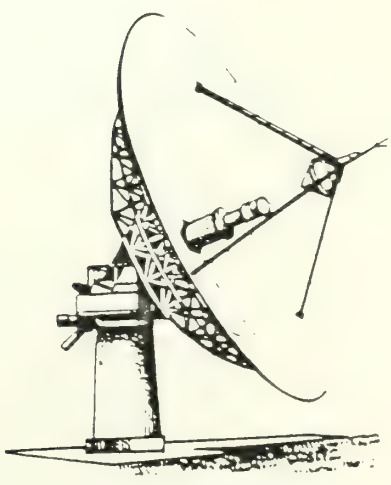
ALAN HAHN, President, Hickory Mountain Associates, is a telecommunications engineer who has worked extensively in design, construction and operation of cable television systems and terrestrial and satellite telecommunications systems. Among Hickory Mountain's clients are Wade Communications, Inc., the cable television franchisee in West Philadelphia; New York University and the NYU Medical Center; and a subsidiary of Metropolitan Life Insurance Company, managing agents for the Pan Am Building in New York.

LISA SAVEREID is a senior consultant with Price Waterhouse in Boston. She was formerly staff member of the the U.S. Senate Committee on Nutrition, and deputy director of the Office of Policy Management for the City of Boston. Ms. Savereid is a graduate of the University of Kent at Canterbury, England.

DANIEL OFFNER is Special Assistant for Economic Development at the University of Massachusetts at Amherst. A graduate of Yale University, Mr. Offner has served as a congressional staff member and a consultant to higher educational institutions.

APPENDIX 4

Letters of Endorsement and
Letters of Intent



THE COMMONWEALTH OF MASSACHUSETTS
EXECUTIVE DEPARTMENT
STATE HOUSE • BOSTON 02133

MICHAEL S. DUKAKIS
GOVERNOR

April 28, 1986

The Honorable Edward M. Kennedy
United States Senate
113 Senate Russell Office Building
Washington, D.C. 20510

Dear Ted:

On Wednesday, April 30, a group of Massachusetts representatives from government, academia, and industry will meet with you in Washington concerning the Massachusetts Corporation for Educational Telecommunication's (MCET) proposal to establish a model educational telecommunications network. I strongly urge your support for this project which will have far-reaching ramifications for our state, the New England region, and the nation.

In order to improve our classrooms, improve the quality of our students and restore the competitiveness of our industries, MCET has developed a proposal to establish the nation's first statewide educational telecommunications network. This network will use state-of-the-art technology to facilitate the sharing of information and teaching resources among primary and secondary schools, colleges and universities, and industry.

For many years, you have supported cutting-edge initiatives in Congress to help our nation's educational system keep pace with rapid developments in our society and economy. I believe that the use of advanced telecommunications technology for education is just such an initiative. We have an opportunity in the MCET proposal to build a prototype educational telecommunications network that other areas of the nation can follow to modernize and improve their educational systems.

The MCET network proposal has my administration's full support, and I am looking forward to working with you to explore the possibility of federal support for this national demonstration project.

Sincerely,

Michael S. Dukakis

MSD/csc

M/A-COM, INC.
7 NEW ENGLAND EXECUTIVE PARK
BURLINGTON, MASSACHUSETTS 01803
(617) 272-9600
TWX 710-332-6789 • TELEX 94-9464

April 28, 1986

Mr. Richard A. Borten
Executive Director
Massachusetts Corporation for Educational Telecommunications
McCormick State Office Building
1 Ashburton Place
Boston, MA 02108

Dear Mr. Borten:

Please be advised that M/A-COM, Inc., a Massachusetts based company, has reviewed your organization's preliminary plans relative to an Educational Network for Massachusetts.

We believe the plan to be realistic and technically sound and we, as a company, are certainly interested in participation in the program. Obviously we would be interested in supplying hardware and systems networking capabilities, but based upon our limited knowledge at this time we would also most likely be interested in participating in a testing program which might be appropriate for other similar systems nationwide.

Please contact Mr. Jack Shaw, President of our Telecommunications Division, should we be able to assist you in any manner.

Sincerely,

Frank Brand JAS
Frank Brand
Acting Chief Executive Officer and
Executive Vice President and
Chief Operating Officer.

JAS/jd

cc: J. Shaw

Scientific Atlanta

Satellite Communications Division
North Building, 3845 Pleasantdale Road, Atlanta, GA 30340; Telephone 404-449-2000; TWX & Telex 404-461-1804; Fax 404-449-2746

March 21, 1986

Mr. Richard A. Borten
Corporation for Educational Telecommunications
One Ashburton Place
Boston, Massachusetts 02108

Dear Richard:

I am pleased to express the support of Scientific-Atlanta for the statewide television network plans of the Commonwealth of Massachusetts. We stand prepared to assist you in your design of both satellite and local area networks. As you are already aware, our depth of experience in these areas will allow us to recommend the optimum configurations of equipment for various applications.

The system concept that you have discussed represents a major future direction of education networks. If you select Scientific-Atlanta to support you we assure you that our prices represent the most cost effective solution.

Please feel free to call on me as you may require.

Sincerely,

John P. Lappington

John P. Lappington
General Manager
Satellite Communications Division

JPL/sfg

CC: Dan Landreth
Jim Schiltz

Cullinet

Cullinet Software, Inc. 400 Blue Hill Drive Westwood, MA 02090 Telephone (617) 329-7700

John J Cullinane
Chairman of the Board

September 20, 1985

Chancellor John B. Duff
Chairman
Corporation for Educational
Telecommunications
McCormack Building, Room 1020
One Ashburton Place
Boston, MA 02108

Dear Mr. Duff:

I am writing to let you know of my enthusiastic support for the effort which The Corporation may soon launch to develop a state-of-the-art educational telecommunications network for Massachusetts. This network will, as I understand the proposal from Bill Cloherty, enable every high school in The Commonwealth to have an effective connection to the network. This will be a very welcome addition to the opportunities for educational advancement on the part of our students.

This concept of a technologically advanced network will be a great asset for Massachusetts and New England. I hope that the Board seizes the opportunity to have this project developed in Massachusetts.

You have my full support for this important endeavor.

Very truly yours,

JJC/mc

Massachusetts Teachers Association

Nancy J. Finkelstein, President
Rosanne K. Bacon, Vice President
Edward P. Sullivan, Executive Director-Treasurer

May 13, 1986

Dr. David C. Knapp
Chairman
Massachusetts Corporation for
Educational Telecommunications
One Ashburton Place -- Room 1020
McCormack State Office Building
Boston, MA 02108

Dear Dr. Knapp:

The Massachusetts Teachers Association strongly supports the efforts of the Massachusetts Corporation for Educational Telecommunications (MCET) to secure federal funds for the development of a statewide telecommunications network.

As the collective bargaining representative of over 55,000 public school teachers in the Commonwealth as well as 6,000 faculty and administrators at the state's public colleges and universities, MTA sees the benefits such a network could bring to the educational environment of Massachusetts.

The Commonwealth, along with the entire nation, feels the impact of the declining numbers of individuals selecting teaching as their life's profession. In addition, cities and towns face restrictions imposed on them by Proposition 2 1/2 and resulting reductions in educational resources.

The development of a telecommunications network could enhance the ability of communities and regional school districts to share limited resources -- both in economic and manpower terms. For example, students in different communities could be given afternoon homework assistance by a teacher at a remote site via telecommunications; school systems could jointly offer otherwise unavailable specialized or low enrollment courses to students. At the Higher Education level, faculty representing one particular discipline, but located at several of the state's community colleges, could participate in teleconferences to discuss common issues and concerns.

As part of the National Education Association, we support the development of a telecommunications network that will serve as a model to be replicated across the United States. We hope the Massachusetts network can be expanded throughout the New England Region to reach school children in the largest cities and most remote towns.

Again, I encourage you in the efforts and hope I can be of assistance and support in the coming months.

Sincerely,

Nancy Finkelstein

Nancy J. Finkelstein
President

NJF:af:2913I

THE SCHOOL COMMITTEE OF THE CITY OF BOSTON

BOSTON PUBLIC SCHOOLS
OFFICE OF THE SUPERINTENDENT
LAVAL S. WILSON

March 10, 1986

Dr. David C. Knapp, Chairman
Massachusetts Corporation for
Educational Telecommunications
One Ashburton Place - Room 1020
McCormack State Office Building
Boston, Massachusetts 02108

Dear Dr. Knapp:

The Boston schools have been very active in the use of educational technologies. Over the past four years, as a result of major commitments by the School Department, Boston has one of the broadest and most effective technology programs in the country.

The Boston schools have many resources that can be shared with other school systems in the state over a telecommunications network. Our television facilities are currently producing material for the Boston cable system. Additionally, we have developed a number of excellent teacher training programs which could be incorporated into statewide television programs.

There are a number of ways Boston could benefit from the proposed Educational Telecommunications Network and Technology Resource Centers. Our schools are always in need of additional sources of technology information. It would be beneficial for us to access databases and bulletin boards for the sharing of information among educators and administrators. We would also be interested in telecourses in subjects such as advanced science, as well as arts and other "enrichment" subjects that are not available at all of our schools.

The Boston Public Schools endorses MCET's proposal for the Educational Telecommunications Network and Technology Resource Centers, and looks forward to participating in these exciting projects.

Sincerely,

Laval S. Wilson

Laval S. Wilson
Superintendent

LSW:mc

26 COURT STREET • BOSTON, MASSACHUSETTS 02108 • [illegible] AREA 617



SCHOOL LIBRARIES•PRODUCTION CENTER•HIGH SCHOOL TELEVISIO

BETSEY BOHL, Supervisor
Patt Moser

Instructional Media Center
Chelmsford Public Schools
200 Richardson Road
North Chelmsford, Massachusetts 01863

March 11, 1986

Ms. Ruth Ballinger
Corporation for Educational Telecommunications
McCormack Building
One Ashburton Place
Boston, Massachusetts 02108

Dear Ruth,

I am quite happy to hear that your plans for a state wide telecommunications network are beginning to gel. Because Chelmsford has been a leader in television technology since the 1960's, I am certain that the students, teachers, and administrators of the Chelmsford schools will eagerly benefit from such a network. One of the areas that students might particularly benefit from is in the interactive televised delivery of courses where the class size is too small to warrant a full time teacher. I am referring to subjects such as Russian, Chinese, or advanced math and science courses in which only a few students are interested. Televised courses would allow the school to offer the subject without having to pay full wages to a teacher.

I would also like to remind you of the Merrimack Education Center here in Chelmsford. It already has an excellent "Technology Resource Center" and could be a model for any future centers you may create.

Good luck with your endeavor. It's realization will serve us all.

Sincerely,

Patt Moser

Patt Moser
Supervisor Instructional Media

PM:r

(617) 251-8792 Ex. 228

WATERTOWN Public Schools

30 Common Street • Phone 926-7700 Watertown, Massachusetts • 02172

JOHN G. FLORES
CURRICULUM CHAIRMAN K-12
DEPARTMENT OF LIBRARY MEDIA SERVICES
OFFICE—HIGH SCHOOL
51 COLUMBIA STREET
PHONE 926-7769

March 18, 1986

Dr. David Knapp
Corporation for Educational
Telecommunications
McCormack Building
1 Ashburton Place
Boston, MA 02108

Dear Dr. Knapp:

The Corporation for Educational Telecommunications represents the present as well as futuristic school needs regarding utilization of technologies by students, teachers and parents.

As a voice for this emerging reality, Watertown Public Schools wholeheartedly endorses MCET's initiative in creating this idea and nurturing it to fruition.

Watertown Public Schools hopes to join you as partners and offers its support in this mutual goal.

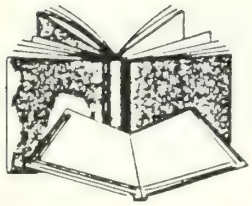
Sincerely,

John G. Flores

John G. Flores
Curriculum Chairman
Library Media Services

JGF:cf

CC: Ms. Ruth Ballinger



Wayland

public schools

May 30, 1986

Dr. David C. Knapp
Chairman of the Board
Massachusetts Corporation for Educational Telecommunications
McCormick State Office Building
One Ashburton Place
Boston, MA 02108

Dear Dr. Knapp:

The intelligent uses of technology to enhance the learning of Wayland students has captured the imagination and support of this community. In recent years, while creative applications of technology have been introduced to our school system, we have also faced the practical realities of fiscal restraints and declining enrollments during the same period.

Along with our colleagues in The Educational Collaborative (TEC) we have been investigating ways of electronically linking the best of our instructional resources in hopes of providing solutions to the problem of delivering quality instruction to our students. We are encouraged by and support the efforts that the Massachusetts Corporation for Educational Telecommunications (MCET) are initiating to develop video and data transmission capacity which have the potential of connecting institutions of learning within the Commonwealth.

We also recognize the potential benefit to administrative applications such as accessing data bases and electronic bulletin boards to further enhance our school operations.

The Wayland Public Schools stand ready to cooperate with MCET and further endorses its initiatives in the development of technology resources. We look forward to participating in this project.

Sincerely,

William G. Zimmerman, Jr.
Superintendent of Schools

WGZ/bn

41 Cochituate Road
ayland, Massachusetts 01778-0408
(617)358-7728

lliam G. Zimmerman, Jr
perintendent of Schools

chael V. Ananis
sistant Superintendent

vid P. Connolly
ector of Business Affairs

South Shore Educational Collaborative

An Educational Collaborative Serving

BRAINTREE ▪ COHASSET ▪ HINGHAM ▪ HULL ▪ NORWELL ▪ QUINCY ▪ SCITUATE ▪ WEYMOUTH

March 3, 1986

David Knapp, President
Corporation for Educational
Telecommunications
One Ashburton Place
Boston, MA. 02108

Dear Mr. Knapp:

I endorse your proposal to develop a regional educational telecommunications resource center on the South Shore. We look forward to participating in this exciting venture.

The Collaborative, as you may be aware, provides special education programs and services for low incidence populations to the eight schools on the South Shore. A special education computer resource component would provide a valuable service to the Collaborative and eight school systems for this population and other special needs students.

Furthermore, this center could serve the instructional needs of the eight systems through the center by using the medium of television to provide specific courses between and among the eight school systems. The eight systems have demonstrated reductions in the number of students for the past three years. This reduction in enrollment is necessitating a concomitant reduction in certain instructional course offerings. Thus, this center could serve as the provider of specific selected courses for many students. In addition, it could provide advanced placement courses for many of the school systems who do not have a sufficient number of students within their systems to offer the courses.

Thus, as you can see, I believe this is an exciting and viable service that can be provided through the Collaborative.

Sincerely,

Michael J. Savage, Ed.D.
Executive Director

MJS/jg

EAST SCHOOL, COLLINS ROAD, HINGHAM, MASSACHUSETTS 02043 ▪

	Admin.	S.S. High & Quest	Community Program
	749-7518	749-8354	740-1808

tec

THE EDUCATION COOPERATIVE

C/O WELLESLEY MIDDLE SCHOOL, 50 KINGSBURY STREET, WELLESLEY, MASSACHUSETTS 02181

TELEPHONE: 617-237-3028

ROGER RITCH
Executive Director

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BARBARA C. LARKIN
C. LOUIS CEDRONE
Westwood

ELIZABETH N. DIEMAN
Administrator for Special Services

DARLENE PENDELL
Administrator for Career/
Occupational Education

CAROLE LOBACH
Director of
T.E.C.—Phoenix Schools

March 4, 1986

President David Knapp
Chairman
MASS. CORP. FOR EDUCATIONAL
TELECOMMUNICATIONS (Room 1020)
One Ashburton Place
McCormack State Office Building
Boston, MA 02108

Dear President Knapp:

The Education Cooperative was established in 1966 by the school committees of Dedham, Dover, Natick, Needham, Norwood, Sherborn, Walpole, Wellesley and Westwood.

The purpose of the Cooperative (TEC) is to identify, analyze and implement special programs and services for school age children when such programs and services are more efficiently, effectively and economically provided through a collaborative effort.

There is a growing database that conclusively demonstrates that our ability to maintain the comprehensive secondary curriculum which West Suburban Boston schools have traditionally prided themselves in, is being seriously challenged by increased class sizes, course combinations and reductions, and scheduling limitations. Due to a combination of declining enrollments and Proposition 2½ fiscal limitations, the wide spectrum of instructional opportunities, historically presented to all students, is rapidly shrinking.

I see the MCET network as a vehicle through which schools can make the full array of academic options available to students. With the help of the MCET network and Technology Resource Centers, neighboring communities could use telecommunications technology to develop interactive video and audio links between schools allowing them to share classes and thereby maintain low enrollment courses. Students

could attend "conferencing sites" in their high school and fully interact with a neighboring French IV, Russian History or Advanced Placement Calculus class. Teachers could receive training and support programs right in their home schools via satellite. The use of video amd computer technologies as tools for communication and information sharing would become a day-to-day reality for teachers, students and administrators alike.

Preliminary studies that The Education Cooperative has already done have convinced us that the West Suburban Boston schools will benefit greatly from the resources that would be made available through the implementation and operation of the MCET network and Technology Resource Centers. It is our intent to fully utilize these services and capacities to provide students with educational and experiential opportunities that will prepare them for college and beyond that, for life in an increasingly competitive and technology-oriented world.

We are most appreciative of your creative planning and enthusiastically endorse your search for federal support.

Cordially,

THE EDUCATION COOPERATIVE

Roger W. Ritch
Director

RWR:dh

THE COMMONWEALTH OF MASSACHUSETTS
BOARD OF REGENTS OF HIGHER EDUCATION
ROOM 619, McCORMACK BUILDING
ONE ASHBURTON PLACE
BOSTON, MASSACHUSETTS 02108-1530

February 28, 1985

Richard Borten, Executive Director
Corporation for Educational Telecommunications
McCormack State Office Building
One Ashburton Place
Boston, MA 02108

Dear Rick:

As Chancellor of the Board of Regents of Higher Education, I am aware of the growing importance of advanced telecommunications technology to colleges and universities. I have witnessed the commitment that many Massachusetts institutions have made to the development of state-of-the-art communications facilities, and have observed the efforts of other states in creating telecommunications networks linking universities and even connecting educational institutions to industrial sites.

An increasing number of the Commonwealth's institutions of higher learning express an urgent need for access to lower cost voice telecommunications systems, for a network that can enable them to share data and resources, and for an affordable means of transmitting television signals carrying video courses and teleconferences to off-campus locations. Colleges and universities also recognize that the development of such telecommunications capacity is beyond the means of any individual institution.

I firmly believe that the statewide telecommunications network being planned by MCET will serve these needs and become a crucial element of the state's infra-structure.

The network planned by MCET will also be of genuine value to the Board of Regents, enabling us use of teleconferencing for statewide meetings, to expand and reduce the costs of the Regents Data Network, and to distribute information and programming on a statewide basis. The Board of Regents supports the development of MCET's voice, data and video network and fully intends to utilize its services and capabilities.

Sincerely,

John B. Duff
Chancellor

JBD:bcd

BOSTON COLLEGE
CHESTNUT HILL, MASSACHUSETTS 02167

OFFICE OF THE PRESIDENT

April 10, 1985

Mr. Richard A. Borten
Executive Director
Corporation for Educational
Telecommunications
McCormack State Office Building
One Ashburton Place
Boston, Massachusetts 02108

Dear Mr. Borten:

As a college president serving on the Board of Directors of the Massachusetts Corporation for Educational Telecommunications, I am well aware of both the communication issues facing colleges and universities, and the potential benefits such institutions could derive from the availability of affordable voice, data and video telecommunications capacity.

Boston College has made a major investment in recent years in the improvement of its communications capabilities. We have interconnected our Chestnut Hill and Newton campuses with fiber optic cable and have modernized our telephone system. But like other Massachusetts institutions of higher learning, we still lack access to capacity for video conferencing or for the distribution of courses and other information. Unfortunately, the creation of the facilities needed to accomplish these goals is beyond the financial means of any single institution.

Boston College already participates in nationwide audio-conferencing with other members of the Institute for Inter-University Cooperative Research. The statewide telecommunications network being planned by MCET -- and the planned availability of satellite transmitting capacity -- would enable us to reach many more institutions for the sharing of research, instructional programming and administrative information.

Boston College looks forward to the development of MCET's network and I anticipate that we will be using it to meet our institutional goals.

Sincerely,

J. Donald Monan, S.J.
President

JDM:mjl

EMERSON
COLLEGE

100 BEACON STREET BOSTON, MA 02116
617 578-8510

ALLEN E. KOENIG
PRESIDENT

January 22, 1985

Mr. Richard A. Borten, Executive Director
Massachusetts Corporation for Educational Telecommunications
McCormack State Office Building - Room 1020
One Ashburton Place
Boston, MA 02108

Dear Mr. Borten:

It is my understanding that the Massachusetts Corporation for Educational Telecommunications (MCET) intends to develop video and data transmission capacity for the use and interconnection of institutions of higher learning, libraries, businesses, industry and government in the Commonwealth. Emerson College is engaged in a wide range of activities which would benefit from access to such telecommunications capacities. We have a special interest in such areas as the distribution of courses to off-campus locations in Massachusetts, for video and audio conferencing, for data transfer and database sharing, and for the dissemination of programming.

We realize that it is beyond the means of any single educational institution to develop statewide capacity. We are, therefore, interested in the use of transmission capacity that MCET might develop and make available at reasonable costs.

As a former member of the Massachusetts Educational Telecommunications Commission, I had the opportunity to become familiar with some of the options and services that the Corporation is pursuing. We appreciate the Corporation's consideration of Emerson College's needs and goals in its initial planning efforts, and expect to use the services MCET offers as they are appropriate to our needs and goals.

Sincerely,

Allen E. Koenig

AEK:LR

HARVARD UNIVERSITY

OFFICE OF THE PRESIDENT

MASSACHUSETTS HALL
CAMBRIDGE, MASSACHUSETTS 02138

February 6, 1985

Dear Mr. Borten:

It has come to my attention that the Massachusetts Corporation for Educational Telecommunciations (MCET) is working to develop video and data transmission capacity for the use and interconnection of institutions of higher learning, businesses, industry, and government in the Commonwealth. Harvard University is most interested in the potential activities which could become available from access to such telecommunications transmission capacities.

Harvard is currently engaged, on a limited basis, in offering instruction through telecommunications to off-campus locations in Massachusetts. In addition, Harvard is well aware of the increasing need for video and audio conferencing; for data transfer and database sharing; and for the local, national, and international dissemination of programming.

Harvard has been able to fulfill some of its immediate needs in the area. However, I do not believe a single educational institution can realistically expect to be able to develop statewide telecommunications capacity. For these reasons we are genuinely interested in the use of transmission capacity that MCET might develop and make available at reasonable costs.

We appreciate the fact that the Corporation has considered Harvard's telecommunications needs and goals, and we hope to be able to use the capacities and services MCET offers as they are appropriate to our needs and goals.

I would appreciate it if you could continue to keep Dr. Alfred Pandiscio, Associate Director for Video Services, informed of developments that may be of interest to Harvard. Thank you in advance for your consideration.

Sincerely,

Derek Bok

Mr. Richard A. Borten
Massachusetts Corporation for
Educational Telecommunications
McCormack State Office Building, Room 1020
One Ashburton Place
Boston, MA 02108

OFFICE OF THE PRESIDENT

CAMBRIDGE, MASSACHUSETTS 02139

January 4, 1985

Richard A. Borten, Executive Director
Corporation for Educational Telecommunications
McCormack State Office Building
1 Ashburton Place
Boston, Massachusetts 02108

Dear Mr. Borten:

President John Silber of Boston University has forwarded to me a copy of the legislation creating the Massachusetts Corporation for Educational Telecommunications along with other materials describing the Corporation's activities and goals. After reading that material and following consultation with others at MIT, I conclude your organization's planned voice, data and television network would provide an important and beneficial resource to MIT and other institutions of higher education in Massachusetts.

MIT itself has long been active in applying telecommunications technology to academic purposes. We have operated our own broadband communications network on campus for many years and are currently developing a state-of-the-art local area network known as "Project Athena." MIT also began recently to lease Instructional Television Fixed Service (ITFS) capacity from the Boston Catholic Television Center which will enable us to reach our Lincoln Laboratory in Lexington with instructional programming. We are in the process in addition of developing a microwave television link with the research facilities at Woods Hole, Massachusetts.

Like other institutions of higher education, MIT foresees a need to reach an increasing number of locations with television, data and voice communications. It is clear, moreover, that the development of a statewide telecommunications network by any

single institution is neither financially feasible nor efficient. Therefore, the idea of the Massachusetts Corporation for Educational Telecommunications, a state organization, developing such capacity and making it accessible at reasonable cost to all educational institutions, is a very positive step from our perspective.

MIT's demand for voice, data and video telecommunications capacity has increased dramatically over the past 10 to 12 years. We expect that demand -- and the need to reach out to an expanding number of other institutions, research facilities, and work-sites -- to continue to grow in the years to come. We would find it very desirable to look to the Corporation for Educational Telecommunications for affordable capacity in the future and it would be our intent to use that capacity as it might be appropriate to our needs.

Sincerely,

Paul E. Gray
President

cc: Chancellor Duff
President Silber

The Commonwealth of Massachusetts

MASSASOIT COMMUNITY COLLEGE
ONE MASSASOIT BOULEVARD
BROCKTON, MASSACHUSETTS 02402

OFFICE OF THE PRESIDENT

January 30, 1985

Richard A. Borten, Executive Director
Massachusetts Corporation for
Educational Telecommunications
McCormack State Office Building
One Ashburton Place - Room 1020
Boston, Massachusetts 02108

Dear Mr. Borten:

It is my understanding that the Massachusetts Corporation for Educational Telecommunications (MCET) intends to develop video and data transmission capacity for the use and interconnection of institutions of higher learning, libraries, businesses, industry and government in the Commonwealth. Massasoit Community College is engaged in a range of activities which would benefit from access to such telecommunications transmission capacities.

We need telecommunications capacity for such purposes as the distribution of courses to off-campus locations in Massachusetts; for video and audio conferencing, for data transfer and database sharing; and for the dissemination of programming.

Massasoit Community College realizes that it is beyond the means of any single educational institution to develop statewide capacity. The college already has a television studio and adjacent space which could provide a convenient telecommunications center for the area. For these reasons we are genuinely interested in the use of transmission capacity that MCET might develop and make available at reasonable costs.

Massasoit Community College has had the opportunity to become familiar with some of the options and services the Corporation is pursuing. We appreciate the Corporation's consideration of the college's needs and goals in its initial planning efforts. It is our intent to use the capacities and services MCET offers as they are appropriate to our needs and goals.

Sincerely,

Gerard F. Burke
President

cc: Dean Yess
Ralph Green

Kenneth G. Ryder
President

February 12, 1985

Mr. Richard A. Borten
Executive Director
Massachusetts Corporation for
Educational Telecommunications
One Ashburton Place -- Room 1020
Boston, Massachusetts 02108

Dear Mr. Borten:

It is my understanding that the Massachusetts Corporation for Educational Telecommunications (MCET) intends to develop video and data transmission capacity for the use and interconnection of institutions of higher learning, businesses, industry and government in the Commonwealth. Northeastern University is actively engaged in a wide range of activities which would benefit from access to such telecommunications transmission capacities.

Northeastern University was the first Massachusetts institution to develop an Instructional Television Fixed Service (ITFS) facility to provide courses to high technology industry. During the current academic year, Northeastern is offering 72 courses to over 700 students at work sites throughout the route 128/route 495 area. Through this network, Northeastern offers courses at 20 satellite facilities.

Access to a state telecommunications network would enable Northeastern to expand its off-campus course delivery to other parts of the state. Additionally, this network would provide us with the opportunity for audio and video conferencing, for data transfer and database sharing; and for local, national, and international dissemination of programming.

Northeastern believes it is beyond the means of any single educational institution to develop statewide capacity. For these reasons we are genuinely interested in the use of transmission capacity that MCET might develop and make available at reasonable costs.

Northeastern University

360 Huntington Avenue, Boston, Massachusetts 02115

Mr. Richard A. Borten
Continued

My administrative staff and I have had the opportunity to become familiar with some of the options and services the Corporation is pursuing, and with MCET's personnel. We appreciate the fact that the Corporation has considered Northeastern's telecommunications needs and goals. It is our intent to use the capacities and services MCET offers as they are appropriate to those needs and goals.

Sincerely,

Kenneth G. Ryder
President

KGR/fd

Commonwealth of Massachusetts
Board of Library Commissioners

648 Beacon Street • Boston, Massachusetts • 02215 • 617 267-9400 • 800 952-7403

3 January 1985

Mr. Richard A. Borten, Executive Director
Massachusetts Corporation for Educational
Telecommunications
McCormack State Office Building
One Ashburton Place
Boston, MA 02108

Dear Mr. Borten:

It is my understanding that the Masachusetts Corporation for Educational Telecommunications (MCET) intends to develop video and data transmission capacity for the use and interconnection of libraries, educational institutions, business, industry and government in the Commonwealth. The Massachusetts Board of Library Commissioners and the libraries of the Commonwealth are actively engaged in activities which would benefit from access to such telecommunications transmission capacities.

We need telecommunications capacity to implement our plan for the establishment of a statewide automated resource sharing network for libraries. This plan sets forth a conceptual framework within which public, academic, school, and special libraries can use computer technology to improve their resource sharing efforts by increasing citizen access to the state's information resources.

The library network now evolving in Massachusetts is facing a telecommunications dilemma. We know that increased access to information and resource sharing is realized through the economies of scale offered by shared computer systems over stand alone systems. However, resource sharing must depend upon telephone technologies we can barely afford and which do not take advantage of our computer power. As a result, telecommunications has become our largest obstacle to resource sharing.

The Massachusetts Board of Library Commissioners is eager to work with MCET. We have had the opportunity to become

familiar with some of the options and services the Corporation is pursuing. We appreciate the Corporation's consideration of the libraries' needs and goals in its initial planning efforts. It is our intent to use the capacities and services MCET offers as they are appropriate to our needs and goals.

Sincerely,

Roland R. Piggford
Director

RRP/ek

The Commonwealth of Massachusetts
Field Center for Teaching and Learning
Bridgewater State College
Bridgewater, Massachusetts 02324
(617) 697-1592

March 12, 1986

Ms. Ruth Ballinger
Corporation for Educational
Telecommunications
McCormack Building
One Ashburton Place
Boston, MA 02108

Dear Ms. Ballinger:

Thank you for the information on the Corporation for Educational Telecommunications. As I reviewed your documents, I could see at least three types of programs where the Field Center could collaborate with your agency.

As a state-wide organization, the Field Center must find ways to reach and serve teachers in all areas of the State, and we are quickly reminded when people think they have been overlooked. The first activity is the sponsorship of training workshops where we can offer concurrent sessions at three or four sites and share the principle presentor. At the moment, we must design traveling road shows which are expensive and major speakers are reluctant to commit to five or six presentations.

We need to bring together small groups or task forces to explore a variety of topics. Again, we are expected to involve people from across the State. The participants seem to spend more time in travel than at the meetings. Again your agency could help us.

Finally, we need to disseminate information on effective programs. Video tapes would be ideal, but live broadcasts where the developers can respond to questions is better.

These are three ideas that came to mind immediately when I saw your material, and I know that others will surface as I have more time to think and look at our long range plan. Let's plan to meet at some point in the Spring to discuss your agency and the Center.

Sincerely,

Wm. L. Dandridge

William L. Dandridge
Executive Director

WLDsh

Enc.

THE FORD HALL FORUM
INCORPORATED

Let there be light

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President 1978-1981
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President 1981-1983
eased

7 May 1985

Richard A. Borten, Executive Director
Massachusetts Corporation for
Educational Telecommunications
One Ashburton Place, Room 1020
Boston, Mass. 02108

Dear Mr. Borten:

Since 1908 the Ford Hall Forum has presented timely, knowledgeable, and controversial speakers to Boston audiences. Our lectures are free to the public and have been broadcast on radio for a number of years. The Forum is aware of advances in telecommunications technology which could enable us to expand our audience, and is beginning to explore the options available to us.

The Ford Hall Forum sees the network proposed by the Massachusetts Corporation for Educational Telecommunications, with its connection to a satellite uplink, as an opportunity to transmit our lectures nationwide. We are very interested in the use of transmission capacity that MCET might develop and make available at reasonable costs.

Massachusetts has a multitude of valuable resources which can be shared with the rest of the nation through MCET's network and uplink. The Ford Hall Forum, as America's foremost free public lecture forum, is just one resource which should be available to audiences outside Boston.

We appreciate the Corporation's consideration of the Forum's goals. As we investigate the possibilities for video transmission, we will continue to work with MCET and to use the services that it offers as they are appropriate to those goals.

Sincerely,

Donald B. Gratz
Executive Director

DBG/sm

8 Winter Street, Boston, Massachusetts 02108 Telephone (617) 338-5350

The Ford Hall Forum is an educational institution. Contributions to the Forum are deductible for Federal Income Tax purposes.

Massachusetts Municipal Association
131 Tremont Street
Boston, Massachusetts 02111 · (617) 426-7272

March 14, 1985

RICHARD A. BORTEN, EXECUTIVE DIRECTOR
Corporation for Educational Telecommunications
McCormack State Office Building
One Ashburton Place
Boston, Massachusetts 02108

Dear Mr. Borten,

The Massachusetts Municipal Association, with a membership that includes 338 cities and towns in the Commonwealth, is very interested in the efforts of the Massachusetts Corporation for Educational Telecommunications (MCET) to develop a statewide two-way voice, data and video network.

The availability of affordable two-way video-conference facilities could allow the Association to supplement our regular meetings for members, with reductions in travel time and expense, and the use of one-way video conferences with telephone return connections could make it possible for the Association to brief large numbers of municipalities simultaneously on fast moving legislative matters. The availability of low-cost voice and data connections between Boston and our more distant western and Cape members could reduce the cost of municipal communications, as well. In addition, there are also possibilities if achieving economies of scale in providing employee training, in expanding school curricula and in many other areas.

It is clear that such a system could benefit the communities that our organization represents, although we must make it clear that we do not feel that the costs of establishing such a network could be borne either directly by communities or through earmarking for this purpose portions of the local aid that communities receive.

I would certainly encourage the Commonwealth and MCET to explore the possibilities of developing such a statewide network and will look forward to discussing with you both the potential uses and the proposed funding for such a system.

Sincerely,

James W. Segel
Executive Director

JWS/rr

New England
Medical Center, Inc.

Jerome H. Grossman, M.D.
Chairman and Chief Executive Officer

171 Harrison Avenue, Boston, Massachusetts 02111 Telephone: (617) 956-5000

March 31, 1986

Dr. David C. Knapp
Chairman
Massachusetts Corporation for
Educational Telecommunications
One Ashburton Place - Room 1020
McCormack State Office Building
Boston, MA 02108

Dear Dr. Knapp:

My staff has discussed with me the proposed development of a statewide telecommunications network by the Massachusetts Corporation for Educational Telecommunications (MCET). New England Medical Center is extremely interested in this network because a number of critical communication issues facing health care providers could be resolved through its establishment and use.

As you may know, New England Medical Center has affiliate relationships with more than 25 health care facilities throughout the state. These institutions are invited to send people on a regular basis to lectures, seminars, and conferences given at the Center. Numerous people have informed us that they would like to attend various seminars but because of the time and travel involved are unable to do so. The MCET network would allow people to attend such meetings and to participate through the interactive nature of the network. The network would be a cost-efficient method of providing continuing medical education.

In addition, the network would facilitate the growing trend toward work-site education for health professionals--an area of increasing interest to all hospitals. Courses could be distributed over the network and received at various institutions allowing personnel to utilize their time most productively.

We also expect to use the MCET network for consultation between primary care physicians and specialists and for distribution of a wide range of educational programming--on preventive health care topics--to the general population.

It is clear that the MCET network will provide unlimited opportunities for health care communication and education. We are very pleased to learn of your efforts and look forward to working with you and MCET to provide improved health care for our citizens.

Sincerely,

Judith Kurland

Judith Kurland
Vice President



MAYOR RICHARD E. NEAL

City of Springfield
36 Court Street
Springfield, Ma 01103
Tel.(413) 787-6100

February 25, 1985

Mr. Richard A. Borten, Executive Director
Massachusetts Corporation for Educational Telecommunications
McCormack State Office Building
One Ashburton Place
Boston, MA 02108

Dear Mr. Borten:

As a member of the Board of Directors of the Massachusetts Corporation for Educational Telecommunications (MCET), I am aware of your plans to initiate the development of a statewide telecommunications system with the creation of a cross-state "spine" connecting Boston, Amherst, and Springfield. I understand that this configuration will provide a voice, data and video telecommunications link between the Commonwealth's two largest cities.

I view this link as vitally important to the state's educational sector, to its business community, to state and local government, and to a wide range of institutions. The availability of capacity for video conferencing between Springfield and Boston could provide a cost effective alternative to the travel required for government-related meetings. Data links between Boston and Springfield could help to ensure a more effective sharing of information across the state. And the availability of low-cost telephone service between the City of Springfield and the state capital could provide an important reduction in this city's telecommunication costs.

I strongly support the development of a statewide telecommunications network in keeping with the mandate of MCET's enabling legislation. The City of Springfield would certainly look to the use of such a system to reduce its communications costs and to enhance municipal communications wth state government and eventually with other municipalities throughout the Commonwealth.

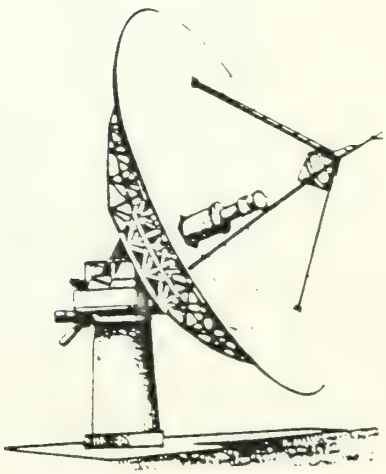
Sincerely,

Richard E. Neal
Mayor

REN/jmb

APPENDIX 5

Network Technical Design



TECHNICAL DESIGN OF THE MCET NETWORK

Main North-South and East-West Microwave Paths

MCET will install four-channel, two-way common carrier microwave transmitters in Boston, at a relay site on the Arlington-Lexington border, in Princeton (to serve greater Worcester), at Pelham (to serve Amherst and Springfield), and at Windsor (to serve Pittsfield). This arrangement will form the east-west network backbone. Other relay sites at Plymouth and Middleborough will be used for microwave relays from Boston to Barnstable (serving Cape Cod) and Dartmouth (serving Fall River and New Bedford), and a northerly link from Arlington to Tewksbury (serving the Lowell and Lawrence areas) will complete the north-south portion. These microwave relays will share existing towers used by the Department of Public Works. Duplicate, fully-redundant program switching centers at UMass/Amherst and MCET in Boston will provide full preview and route switching capability for the entire network, regardless of whether terrestrial or satellite transmission and reception are involved. This degree of technical sophistication will ensure that the overall MCET network operates in as efficient and reliable a manner as possible.

Short-Haul Microwave Interconnections

To derive maximum benefit from the network, MCET proposes to interconnect all greater Boston area colleges and universities directly to the MCET Switching Center by short-haul microwave. Higher education institutions in other parts of the state will be connected via similar short-haul microwave to various relay points on the major microwave trunks. In general, 18 and 23 GHz microwave equipment will be used for this purpose (there is a considerable amount of unassigned bandwidth even in the Boston area in these frequency bands).

Satellite Uplink Facilities

MCET will place a Ku-band uplink (satellite transmitting station) at its Switching Center in Boston and utilize a second, existing Ku-band uplink at the University of Massachusetts campus in Amherst. The Boston and Amherst uplinks will not only provide overall network reliability and redundancy, but will also simplify and shorten the microwave paths connecting the higher education institutions. Ku-band transponders are more readily available than C-band transponders, they permit two-way data communication and they permit the encoding of two video signals on a single transponder.

To enable institutions to reach home viewers through local cable systems and home satellite receive dishes, and to extend the network reach to the many owners of C-band downlinks, MCET will also work

with UMass/Amherst, to install a C-band uplink at that location. This uplink will permit MCET to provide educational programming originating in Massachusetts to potential viewers throughout North America, and, indeed, throughout the world.

Satellite Downlink Facilities

Satellite downlink facilities proposed for the network fall into three main categories. First, approximately 204 health care centers will receive C-band earth station receiving terminals. This equipment will make the MCET network capable of providing telecourses and data information to the medical community statewide and to many hospitals outside Massachusetts that currently have C-band receivers. Should classroom interaction be required, existing telephone systems can be used to provide the question-and-answer pathways.

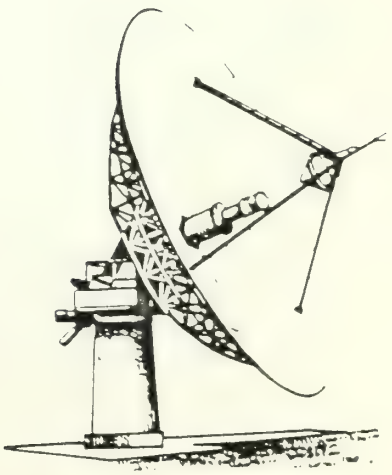
The second type of satellite downlink facility will serve the approximately 270 public school and vocational-technical high school districts in the Commonwealth. Each of these districts will receive a Ku-band satellite receiving terminal. This terminal will receive telecourse material and data communications originating at any of the educational institutions connected to the MCET trunk, and uplinked to a Ku-band communications satellite from the Boston and Amherst facilities. When fully activated, all school districts will be able to receive the most sophisticated telecourses, including simultaneous lectures and data or text transmissions displayed on student personal computer terminals, through this portion of the network. Two-way question-and-answer interaction, where desired, will be provided by existing telephone facilities within each school district.

The third type of satellite downlink facililty will employ very small aperture transmitter ("VSAT") antennas, operating in the Ku-band, at some 50 "magnet" educational locations. These magnet sites will not only be capable of receiving video telecourse and data streams at up to T-1 transmission rates (1.544 Megabits per second), but will also be capable of transmitting data at rates from 56 to 256 Kilobits per second, via satellite, to the Amherst and Boston facilities. From Amherst and Boston, these data streams can be switched and redirected to the desired institution along the network trunk, and can also be received by all 267 school districts and the remaining 49 magnet centers via their Ku-band terminals.

This impressive two-way data transmission capability can be obtained with modern 1.2 to 1.8 meter VSAT antennas, and will permit the most innovative forms of telecourses, wherein students receive video instruction and data displayed on student personal computers, with return data sent to the instructor's computer terminal. These courses may even include the high-speed facsimile transmission of graphic material originating from both instructor and student. This array of instructional capability will open new opportunities for

APPENDIX 6

Recent Press Discussion of
Telecommunications Technology as a Vehicle
for Economic and Educational Development



Boston Globe September 22, 1985

Classroom on the job – via the small screen

By John King
Special to the Globe

This fall, employees at more than two dozen Massachusetts firms are watching television in order to earn credits for engineering and computer courses.

They'll observe lectures, scribble down notes, even interrupt the professor to ask questions. They'll take quizzes and write papers. What they won't do is go to the classroom – or leave the office. When class time comes, they take a break from their jobs, turn on the TV and tune into a live course being taught at a university miles away.

What makes this possible is the Instructional Television Fixed Service. Established in 1963, ITFS is a little-known broadcasting system specifically established to blend traditional education with modern technology.

"Whether they are engineers or teachers, professionals really need efficiently delivered educational information," said Peter Schweich, an assistant provost at Boston University, which broadcasts 11 courses to 13 clients, mostly high-tech firms. "We haven't begun to tap the potential of the system yet.

In Boston, 24 of 28 possible ITFS channels are in use. Half of the licenses are held by Boston Catholic Television, which broadcasts family fare as well as programs about the Catholic, Protestant and Jewish religions; Boston Catholic Telelvision also leases a channel to Boston University. Eight channels are reserved by Northeastern University, and two, by the Harvard Medical School. The remaining four licenses have been applied for by Emerson College and Harvard.

Unlike other systems, ITFS is broadcast on low-frequency microwaves that pass right by the home antenna. Signals are transmitted from point to point; a special converter, purchased by whoever wishes to receive the service, makes the signals intelligible. BCT and Northeastern, for instance, transmit from antennas on the Prudential tower that broadcast signals 25 miles; BCT has smaller transmitters in Framingham and Andover to relay the signal farther.

Although the system has been in place for decades and was used by high-tech companies in California by the early '70s, it has only recently been utilized in the Northeast as a tool for lifelong education.

"The Massachusetts economy, perhaps more than any other state's, is keyed towards information," said Rick Borten, executive director of the Massachusetts Corporation for Educational Telecommunications, established in 1982. "High-tech firms have a real interest in courses that keep employees up-to-date. ITFS is an effective vehicle for making that possible."

A leader in the field is Northeastern University, which has been broadcasting to such firms as Honeywell, Polaroid, Compugraphics, Digital and GTE since fall 1983. Approximately 32 courses are broadcast in the afternoon and evenings; besides offering all the ingredients for a master's degree in electrical engineering and computer science, the courses offer instruction in such areas as mechanical engineering and state-of-the-art technology.

The result is a convenient way for workers to continue their education. "Students" register at work, and Northeastern sends couriers out three times each week to deliver course readings and to pick up papers.

And employees may literally pay nothing. At GTE, for instance, the company pays Northeastern for tuition – $1,100 for a four-credit course, $640 for a non-credit engineering course. Employees who get an A or B owe GTE nothing; students who get a C must reimburse 25 percent of costs, and students who get a D or an F owe GTE the full tuition.

According to Susan Kryczka, director of Network Northeastern, surveys show that employee-students do as well, or better, than their in-class counterparts. "These are usually older students, highly motivated," she said. "They're often being reimbursed, earning a degree that might be tied to an advancement in their job."

TELEVISION, Page A16

John King is senior editor at the Boston Business Journal.

more——→

Classroom on the job — via the small screen

■ **TELEVISION**

Continued from Page A14

The company also gains from such arrangements. "One of the most difficult things to do today is retrain valuable, qualified employees," commented Chris Anderson, director of corporate communications for the Massachusetts High Tech Council. "You have to work to keep them happy. Anything that enhances the job is a benefit."

Borten sees other, less glamorous possibilities for the ITSF. "There's a market for video courses for [immigrant] workers – this could be a way to tackle functional illiteracy by increasing the access to courses in English as a second language," he suggested. "People are often inhibited in a live classroom situation. Television isn't the best alternative, but it's a way to begin dealing with educational problems."

Until this summer, ITFS advocates feared that the marketplace might be allowed to short-circuit the system's potential. In 1983, the Federal Communications Commission allowed holders of channel licenses to lease unused airtime to commercial programmers, such as pay television services; for instance, in communities without cable television, companies that broadcast movies (such as Home Box Office) might buy several educational channels. The only restriction was that 15 hours a week must be reserved for instructional use.

The ruling was opposed both by educators and by potential license holders who felt they could be edged out of future access to ITFS. "What was happening was that national institutions were competing for licenses across the country," Borten explained.

"Applicants would talk about education goals, but you didn't have to be Houdini to see their [applicants'] thrust," Borten said. "In each case, applicants proposed to fund construction of studios by leasing time to commercial interests."

The result of the lobbying was this summer's "Second Report and Order on ITFS," an FCC document that, though it still allowed unused time to be leased, reaffirmed the system's role as an educational tool.

For the next year, only local applicants will be considered for unassigned licenses. After that, any company can apply. But, when there are several competitors for a license, applicants will be favored on the basis of the applicant's proximity to the license, accreditation, a clearly defined academic plan and the applicant applying for under four licenses (in order to allow as many institutions as possible to have channels). Also, the number of hours required for legitimate ITFS use was increased from 15 to 20 hours a week, with another 20 "dedicated" to ITFS use.

"It was a good ruling," Kryzcka said. "It clarified the protected area for signals and made it a little bit easier for local institutions to apply for local space."

Now that ITFS's future as an educational tool here is assured, Kryzcka is confident that it will be utilized and expanded; Northeastern for instance, hopes to offer a master's degree in business administration this winter.

"The primary advantage to the ITFS is that it allows people to continue their education – that's our mission," Kryzcka said. "This isn't some high-tech trend. It's like living and breathing; the niche will always be there."

Tuning in for an education

Video tape, television bringing high-tech data to students

By Jean Caldwell
Special to The Globe

AMHERST – It's 4 a.m. and Bruce Newton – alone in a conference room at the General Electric plant in Pittsfield – plugs in a video tape and turns on the TV monitor to start three hours of class which will lead him next year to a master's degree from the School of Engineering at the University of Massachusetts-Amherst.

Classes via video tape or live television are two ways the nation's engineering schools are trying to solve the problem of keeping the country's 1.3 million engineers up to date with the information explosion in the field of high technology.

The UMass video tape program now serves 200 off-campus students studying electrical and computer engineering and engineering management but it has been so well received during its seven years' existence that Harvey Stone, director of the Office of Extended Engineering Education at the university, says the school will conduct an advertising campaign this month to double the enrollment. The program was begun after Andrew Knowles, vice-president of Digital Equipment Corp., told the school his company needed more electrical engineers. A grant from DEC enabled UMass to build three TV studios. A later grant from Raytheon was used to modernize the School of Engineering microwave lab.

Susan Moulton, exectutive director of the Bay State Skills Corp., which was established to encourage training opportunities and to help provide companies within the state with more trained people, says BSSC has made a $100,000 grant to help the program expand.

Stanford University pioneered the idea of advanced education via television in 1968 and now each year reaches 1800 men and women who work for companies within an 80-kilometer radius of the California institution.

The Nancy School of Mines in France came up with the idea of video taping courses.

Charles Hutchison, head of the Department of Electrical and Computer Engineering at UMass, says the ideal may be to gather students around the professor's knee a la Socrates but the realities of life make this impossible for many working professionals. In the first place, there are not enough faculty members to go around. High salaries offered by industry lure many engineers away from teaching.

Salary, too, keeps young professionals such as Bruce Newton from taking a year off to study for a master's degree full time. "I'm earning too much," he says. Engineers with a bachelor's degree can command salaries in the high $20,000s and low $30,000s fresh out of college.

Part-time study on campus may involve an inordinate amount of travel time and sometimes is impossible to schedule. For example, Newton works days but no night engineering courses are offered on the Amherst campus.

What he watches in his solitary classroom is a regular School of Engineering class that was videotaped the week before. "Classmates" who sat through the live lecture ask questions. If Newton – or any one of the other "long distance" classmates who are scattered from California to Puerto Rico – have other questions, they may phone in during regularly scheduled telephone office hours.

Newton admits he misses the opportunity to interact with other students, the chance to ask a question the moment it comes to mind, and the knowledge of his rank in class. "It's your basic hard work situation," he says. "They are teaching some really nasty stuff." But video taping means the professor can show computer-generated problems both to Newton and his off-campus cohorts and to the live students who watch on desk monitors.

Tom Gregor, administrator of Manpower Development and Training for GE in Pittsfield where Newton works, notes that studying alone requires a great deal of self-discipline and commitment.

Frank Ryan, director of training for the Analytic Sciences Corp. in Reading, says that over the past seven years the company had between 10 and 15 employees taking the videotaped UMass courses at a time. Some watch for credit, others simply audit the course. Ryan predicts off-campus video tape is "something that will be used more and more." Companies like professionals to keep abreast on new developments and employees like the flexibility and convinience of going to school at work.

Anyone who expects the UMass video tapes to be a graduate school version of "Nova" or "Seasame Street" will be disappointed, said Harvey Stone. "It is not pretty television," he explained. The tapes are not edited.

Hutchison said the professor who is going to be videotaped may prepare for class a bit more carefully lest any error be captured on the tape.

On campus students have two reactions to being videotaped. Hutchison said some seem to resent it. When the same course is offered both with and without video at the same time, these students opt for the non-taped session. On the other hand, the idea of taping seems to encourage the ham in some students (professors, too, he says) and some actually seem to ask more questions in class simply because the camera is on. When it comes to performance, Hutchison says the off-campus students "tend to go as far and as fast" as on-campus peers.

Video taping stretches the faculty. Stone says that until last year the UMass School of Engineering could not offer summer courses because faculty was not available. Last summer video tape was used on campus and worked so well that it will be used again this year.

Jack Newcomb, associate director of the Center for Advanced Engineering Studies' continuing education branches of the School of Engineering at MIT, says 30,000 to 40,000 students take non-credit video courses conducted by his institution each year. MIT at one time offered two video tape instructions for credit. This worked well educationally, Newcomb said, but it became too difficult to find the number of students (three to 10) necessary to provide a tutor. MIT has a residency requirement for students who wish to earn a master's degree.

TUNING IN FOR AN EDUCATION

cont'd.

But whether the professional engineer seeking advanced credit sits alone as Newton does, watches "real time television" and askes questions via an FM radio hookup as Stanford enrollees may, or simply acquires non-credit information via one of MIT's specially-prepared courses, it would appear that the "boob tube" has become an important link between the university and industry in the joint effort to keep professional engineers up to date. It may not be perfect, but as Bruce Newton says, "Working and going to school is a problem, but this is probably the only practical way for me to do it."

Computer bus brings software to schools

By Jean Caldwell
Special to the Globe

NORTH ADAMS – An orange and white school bus, equipped with five computers and staffed by two software specialists, has been traveling through Berkshire and Franklin counties since February. The traveling technological vehicle allows elementary-school teachers to sample more than 400 pieces of software.

The Data Bus is a collaboration between North Adams State College and area public schools, funded through the Board of Regents.

Carol Molloy, assistant superintendent of schools in North Adams, conceived the idea of the Data Bus when she realized many elementary school computers were going unused, either because teachers were wary of the new technology or because they did not know how to choose software. At the same time, said Molloy, there is a push toward computer literacy. Most schools expect a child to have had some hands-on experience with computers by eighth grade.

Nicole Del Negro-Jozefik, coordinator of the project, says many software manufacturers do not allow preview of their wares and choosing a product for classroom use from a magazine is unsatisfactory. In addition, many teachers in rural schools have not had any experience with computers. "They come, sit there, and by the time they leave, they are very excited and enthusiastic. They will say 'I really want a computer in my room,' " said Del Negro-Jozefik.

Ann Colker, manager of the project, said software manufacturers have been extremely cooperative in donating their products. In turn, the Data Bus staff has promised to prevent piracy by not allowing the software off the bus.

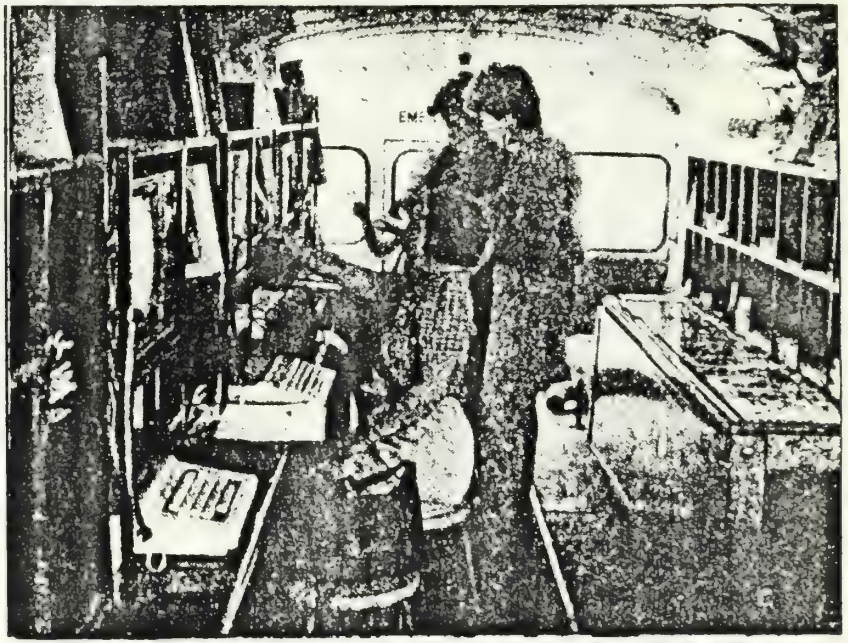
The college carpentry shop outfitted the bus, which was donated by the JT Bus Company of North Adams. Special straps hold the computers in place while the bus is moving, and a special door holds instructional material in place.

Dorothy Giangrandi, who doubles as software specialist and bus driver, says, "you really have to watch where you're going and go at a slower speed to avoid jostling the computers."

Even though the bus does not go out on days when the weather is "iffy," Colker said commercial insurance companies including Lloyd's of London refused to insure it.

Giangrandi parks the bus in the school yard and plugs into the school electrical system to power the computers.

The atmosphere was relaxed and jovial the other day when the Data Bus stopped at Johnson School in North Adams. Principal Carol Colantunano supervised classes as small groups of her teachers slipped out to the bus for short periods.



Data Bus coordinator Nicole Del Negro (in rear) works with teachers Nancy Gaudette (seated) and Donna Burdick (right).
GLOBE PHOTO BY RICHARD CARPENTER

Fourth-grade teacher Nancy Amazza-Gaudette acknowledges, "When I first started, I was apprehensive. I said, 'God – I can't do this.' " Having a chance to try the computers on the bus encouraged her. As the Data Bus made its second trip to Johnson School, Amazza-Gaudette said her classroom now has two Apple IIE computers and half a dozen programs. Amazza-Gaudette does not find catalogs helpful in picking software. She said, "Unless you see the program, maybe it isn't applicable to your class level. Sometimes it is not educator-written. The Data Bus gives you a chance to run the program. If you like it, you come in and beg money."

First-grade teacher Donna Burdick has had more experience on computers than many of her colleagues. She was ready to order several software programs. She finds the Data Bus much more convenient than computer stores, which tend to specialize in business programs. "It's a lot easier to have a greater variety of things that pertain to school," she said.

WEST HARTFORD

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HERALD PHOTO — HARTFORD

LIVE FROM CONARD HIGH

Students of the Conard Solo Choir, from front left, Andy Stabnick, Suzanne Morrison, and Cathryn Roberts, react with laughter to a comment made to a student at the Wesley Girls High School, Conard's sister school, in Taiwan. These students will travel to China April 11. They communicated with the students in Taiwan via freeze-frame video last night, thanks to the Southern New England Telephone Co. Seen at rear, from left, are Ray Callahan, media specialist, and Arthur Woznicki, director of instruction.

Conard High School Choir going to Taiwan

By Rick Hartford
HERALD REPORTER

WEST HARTFORD — We won't say whether Andy Stabnick was blushing last night, because the 900 teenage girls who were looking him over could only see him in black and white.

The entire student body of Taiwan's Wesley Girls' High School had gotten up and had gone to school at 8 a.m. China-time, 7 p.m. here, during vacation week, no less, to see Stabnick and seven other Conard students who will on their way to China next Friday for a visit.

The Conard students represented the 22-member Conard Solo Choir, which will spend a week in Taipei on a singing tour and stay with host families at the school.

The West Hartford students were able to communicate with their Taiwanese friends by what Southern New England Telephone Company (SNET)officials believe to be the first international application in the northeast of "freeze-frame" teleconferencing in the educational field. While it was going on last night in New Haven, schools in Colorado and Hawaii were looking on, officials said.

After the pioneering effort last night, Conard Principal Michael Stephanian said that he hoped that the two schools will develop a friendship that will last a lifetime.

It wasn't by accident that Stabnick was picked first to be West Hartford's good-will ambassador displayed on live video from here to China, Stephanian said.

"These are all girls," he explained.

Stephanian recently returned from being a guest at the high school in Taiwan, and it is obvious he has become attached to both the country and the school.

Unfortunately for the West Hartford students and administrators last night, the picture which originated from China to SNETCO's facility at Science Park was poorly received. Officials figured that the interference was caused by the fact that many phone calls were being made in Taipai at the time of the transmission.

But the sound came through loud and clear — including the estimated thousand giggles from the girls in Taipai, presumably over those handsome young men from Conard: Stabnick, Kevin Bradley, Steve Epstein, and Brian Daley.

There were some nervous and delighted giggles at Science Park, also, as the Conard students exchanged pleasantries and information with some of their peers in China, providing such information as the number of hours the young Americans watch television each day, and whether West Hartford families have more than two children per family.

"I ski, I play the piano, the harmonica, and the Chinese bamboo flute," said 16 year-old Kevin Bradley over the telephone during the live tranmission.

"I'd like to know what kind of hobbies you enjoy," Suzanne Morrison asked one teenage girl, who responded, in English: "Oh! Dear! I have so many hobbies!"

Much of the communication to the students here came in Chinese, with a translator there repeating the comments in English. But much of what the Taiwan students said was in English.

Wesley is Conard's sister school. The school postponed its vacation scheduled for this week so that its entire student body could particpate in the conference.

After principal Stephanian came back from Taiwan last November, he mentioned to the video specialists at the school that he wanted a satellite hook-up with the sister school.

"That's a great idea, Mike, but do you know how much money you're talking about?" was Callahan's reaction, until he had discovered SNETCO's freeze-frame possibilities, far more inexpensive than the satellite transmission.

"It just goes to show you that if you want something done, you get other people to do it for you," Stephanian joked last night.

Can you imagine teaching Asian Studies with an Asian Studies teacher in Taipai? Callahan, media specialist for the school system, asked.

International seminars are also planned for the future, Callahan said.

Callahan, Robert Markarian and John Smeallie had been charged last year to find a way to adpat video technology to the classroom in cost effective ways while maintaining course quality and course offerings at a time of declining enrollment in the two high schools, Callahan said.

While visiting trade shows and technical shows, Callahan learned about the international possibilities from the SNETCO people.

Already, Callahan said, an introductory video freeze-frame course in the Russian language has been offered this year.

Originated at Hall High's studios, it is video-cast live to students at Conard, who react to their teacher via the freeze-frame video.

Freeze-frame video uses regular telephone lines to send and receive pictures, Robert Yoston, SNET's division manager of network services, said.

The video image is converted into an electrical signal, which is converted into a tone and sent to a receiver via the phone lines. It can be done both in black and white and color, officials at SNET said.

Students at the conference last night were Kevin Bradley, Suzanne Morrison, Lori Chichester, Cathryn Roberts, Brian Daley, Andy Stabnick, Steve Epstein, and Diann Vaughan.

Educators present were Conard Principal Michael Stephanian; Robert Markarian, supervisor of media services; Galla Pennington, foreign language teacher; Cathy Chou, foreign language teacher; Callahan, media specialist; Beverly Jackson, music teacher; John Smeallie, video specialist; Arthur Woznicki, director of instructon; Dennis Carruthers, Conard Housemaster and Gene Ronco, Conard housemaster.

In closing remarks to the Chinese girls, Stephanian told them, "I can see you all in your great big assembly hall. You're very special and you're all very beautiful."

Lowell Sun Feb. 9, 1986

For help with homework, tune in a teacher — on TV

By KATHI SCRIZZI
Sun Staff

DRACUT – Is your child confused by ratios, adding fractions, or identifying a pronoun? Do you have trouble explaining the Bay of Pigs invasion or what happened to the ERA amendment?

Homework questions that can confuse the parent as well as the student don't have to go unanswered. Lowell and Dracut teachers are on call during the week to give students a little extra help.

Lowell students in grades K-8 and their parents can find that aid from 4:30 to 7:30 p.m. Tuesdays and Thursdays by calling Dial-a-Teacher, where two teachers use their own expertise, reference books and a list of back-up teachers to talk children through complicated problems.

In Dracut, cable TV provides an hour of "Homework Helper" from 6 p.m. to 7 p.m. Mondays with local teachers as stars, answering called-in questions and providing special weekly lessons.

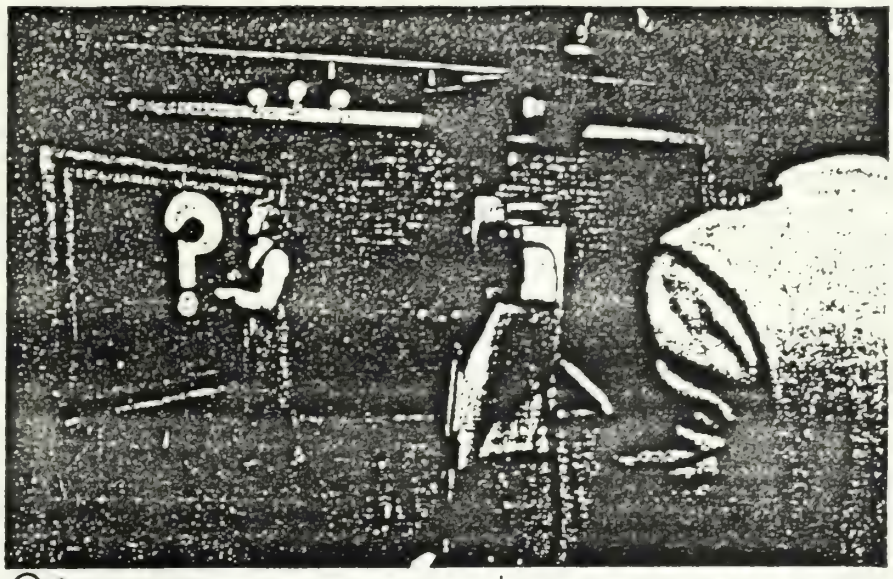
Both services have been averaging 40 to 45 calls a night and hope to increase the number of phone lines so they can take more.

The Dracut show has been on the air since October, courtesy of strong support from community organizations and an initial state grant.

It is filmed live in the Rollins Cablevision studio at Dracut High with a crew of volunteer teenagers. Co-executive producers Pat Carrigg and Janice Sousa host the show in a warm setting of easy chairs, paneling and plants.

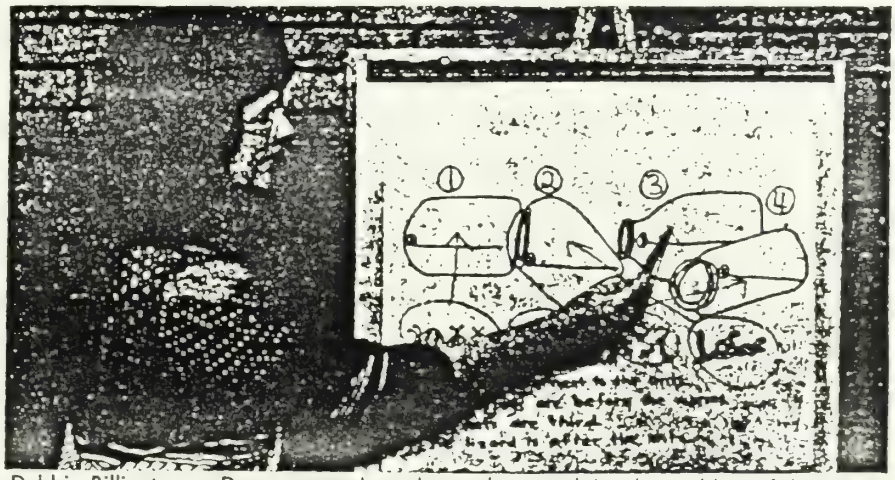
Co-executive producer Michael Michaud and a team of volunteer teachers take called-in questions on the air, working them out on a blackboard between pre-taped segments such as drawing lessons or "Dr. Why."

Michaud had a math word problem to translate Monday night, for example, while Elaine McNamara had to field a phonics question on how to divide words and Kathy Kelley explained when a question mark should be used.



On camera

Dracut second-grade teacher Kathleen Kelley explains how to use a question mark, while high school student Leo McMahon runs the camera for Rollins Cablevision. (Sun photos by David Brow)



Debbie Billington, a Dracut second-grade teacher, explains the problem of the night.

Entertainment, too

"We try to make it like Evening Magazine and homework all in one," said Carrigg. "You get entertainment and a learning experience you can't compare."

From behind the scenes, Monday's show seemed chaotic, but the chaos didn't show on TV, as teachers segued from videotapes to live lessons to stories that won the "I Woke Up and Was the Family Pet" contest.

They also have "problems of the week" which students answer by phone. Those winners are also recognized.

The Dracut teachers said it was important to have interaction with the viewing audience and said there was the only show where students could get their names on TV or see themselves or their friends in taped segments.

Sousa got the idea for the show after doing a videotape last year, and some teachers have since taken television production courses.

Michael McNamara, local access director for Rollins, said 5,700 Dracut homes subscribe to cable.

"We think it's a very popular show," he said. "It's probably only second to the board of selectmen meetings."

"The kids say they enjoy the show," said Sousa. "It's reinforcement for the teacher – you're doing something for the community that has a positive effect on the schools."

Fractions

Dial-a-Teacher is just in its first month of operation at the Pine Street offices of the United Teachers of Lowell, but has already proven popular, particularly just before report cards came out last week.

Tally sheets show most of the callers are in grades 4-6. Math raises by far the most questions; second is language arts.

On Thursday, for example, teacher Jeanne Bergeron got a call on how to add fractions.

"How 'bout if you give me an example and we'll work through it together?" she said. "Are the fractions across or up and down?"

Bergeron patiently went through the example with the student, asked if she understood it and invited her to call back, which she did later when stuck on another problem.

"Parents may be good parents but they might not be good teachers," Bergeron noted. "It's nice for them to be able to call somewhere. If Mom and Dad can't help them, somebody else is there."

Teacher Peggy Mahoney noted the parents of many children who call aren't home, are too busy or don't speak English sufficiently to help their children through some problems.

"The children are learning survival skills," Bergeron said. "There's someone else they can look to."

Teachers for both homework-help programs, though, noted the services are also aimed at helping the parents and children work together.

Carrigg said she has heard many families set aside the hour on Monday nights to watch the Dracut cable show.

Most of the parents' calls to Dial-a-Teacher have been on test-taking and how they can help their children, according to co-chairperson Jeanne Hurtado. A call Thursday was from one who was having trouble explaining a worksheet on colonial history to her child.

Around Needham

'After School Television' to begin

The Needham Public Schools will be bringing informational programming to the community via the Needham Cable Channel 3.

A series of programs, selected by the Media Resource Center of the School Department, will be combined to form two-hour "After School Television" features that will run on Thursday evening from 6 - 8 p.m. and be repeated on the following Tuesday from 4 - 6 p.m.

The Thursday evening and Tuesday afternoon full-time slots will be a permanent fixture on the Needham Channel 3 programming schedule. Consult local cable listings for current program titles and features. The two-hour time blocks will be divided into various age-group segments. This first hour will feature programming from children in grades K - 5, while the second hour will be geared toward middle and high school students.

Parents are encouraged to view along with their children, as school "Bulletin Board" information will be inserted into the schedule. Elementary school news and information can be seen following the K - 5 hour, at approximately 6:58 p.m. Similar middle and high school information will be added at approximately 7:58 p.m. These "Bulletin Board segments will include information on school events, PTC activities, School Committee news, and School Administration activities.

Featured programs are from the Media Department collection of video tapes which include programs produced by the School Department as well as programs acquired through Massachusetts Educational Television (MET.) David S. Porter, Director of Media Services for the Schools, has secured an agreement to cablecast MET programming. Such MET features include *Well, Well, Well* with "Slim Goodbody", a health and fitness awareness program for children in kindergarten thru grade 3. Another MET program, *Readit*, introduces various books each week with the viewer treated to an artist preparing illustrations as the narrator reads the beginning of a story. It will be up to the viewer to read the book to find out "what happens." Many of the books previewed are available in the school media centers.

Other MET titles include *American Legacy*, *Tutankhamun*, *Assignment: the World*. As a timely news program, *Assignment: the World* presents current news in a format designed for upper elementary grade level children. Viewers will be given the opportunity to write in to express your opinion on a weekly topic question.

Original programs produced in the schools include *Teddy Bear Day: Kindergarten Screening in the Needham Public Schools* as well as a series of science programs developed by the Needham Science Center.

The Needham Schools plan is to offer programming on a bi-weekly basis. Continental Cablevision Program Director Jane Schneider has scheduled to replay previous Needham School programming on "off weeks" to give as many children and parents as possible the opporunity to take advantage of this programming.

This program series is planned and developed by the Director of Media Services and Mark St. Jean, Production Specialist.

Televised Classes Help Rural High Schools Offer Fuller, More Demanding Curricula

By Francis C. Brown III
Staff Reporter of The Wall Street Journal

Wendy Pawlick's classroom routine sounds like a dream come true for any high-school student who likes to play hooky. At a tiny school in remote Dime Box, Texas, the 18-year-old senior spends three hours a day watching television and talking on the phone.

Miss Pawlick isn't a truant, though. She is merely one of thousands of students nationwide participating in "satellite learning" programs.

Three of Miss Pawlick's six classes are broadcast live via satellite from San Antonio, Texas, to the Dime Box school district and others in the state. Students in the network watch lessons on special monitors and use cordless phones to ask questions of their teachers or one another.

When colleges and universities began offering courses over television and on videotape about a decade ago, few high schools followed suit. The equipment was prohibitively expensive, and interaction—something more necessary for younger students—was impossible. But now that's changing, as inexpensive satellite dishes become available and technological advances make live, two-way communication possible. With teachers in short supply and states instituting more-rigorous curriculum requirements, many high schools, especially those in sparsely populated rural areas, say televised classes are the biggest educational breakthrough since the computer.

"I really think we are looking at the possibility of a restructuring kind of technology," says Daryl Hobbs, a rural sociologist at the University of Missouri at Columbia.

High-Tech Pranks

Of course, televised teaching has also opened new frontiers for classroom pranksters. One Texas student broadcast an obscene phone call statewide when his class was left unattended. At another school, video equipment worth thousands of dollars was dropped down a stairway.

And technological snags are still a problem. A system that links schools across Texas ran into an unexpected obstacle—heat—and 60 of its 80 satellite decoders had to be replaced. In Utah, a semester's worth of tests and other materials for a satellite class was lost due to a computer glitch. Rainstorms can interfere with transmissions or knock them out completely.

Nevertheless, the number of high schools offering live "telecourses" has jumped sharply in the past year, and network operators are predicting further rapid expansion. Eighty-eight Texas school districts, Dime Box's among them, started receiving classes by satellite in August through TI-IN Network Inc., a private Webster, Texas-based firm. TI-IN, which also broadcasts to California and Arkansas, expects to have 300 clients by next year, up from 110 this year.

In Oklahoma, the number of high-school students taking German doubled this year after Oklahoma State University began offering a televised language class to 50 schools. The network says it has had inquiries from schools in 25 states, and it hopes to double its number of subscribers by next year. In September, students at 26 schools in Utah, Nevada, Colorado and Arkansas began taking a satellite Spanish course broadcast from Utah.

> IN addition to regular courses, one network is planning live sessions with author James Michener and a broadcast from the shuttle of the first teacher in space.

For many schools, the cost of subscribing to a satellite system makes it attractive. Participants in the TI-IN network can receive up to 13 state-accredited courses for an average first-year cost of about $15,000, which includes basic hardware and the subscription fee. This compares with $15,200 for a starting teacher's salary in Texas, says Patsy Tinsley, president of TI-IN. Oklahoma State, which doesn't supply equipment, charges a nominal $1,500.

It is the potential for broadening curricula, however, that most excites educators. "This is the breakthrough we've been looking for to offset the lack of curriculum opportunities that rural schools have been faced with because of scarce resources," says Joe Newlin, director of the National Rural Education Association.

In addition to its high-school courses, TI-IN offers advanced teacher training, Scholastic Aptitude Test reviews and daily one-hour programs that run the gamut from meteorology to first aid. It is also planning live sessions with author James Michener and a broadcast from the shuttle of the first teacher in space. The network in Utah currently offers only Spanish classes, but it is seeking federal funding to add a second, more exotic, language. In Oklahoma, "enrichment" programs cover such diverse topics as the Soviet Union and world population problems.

Preliminary tests show that televised classes apparently don't hinder a student's academic progress. But even supporters of the programs admit that the lack of face-to-face contact between student and teacher is an obvious drawback, despite efforts to personalize the experience. When TI-IN students ask questions, for example, their photographs appear on the television screen. Some teachers write letters to their students; others set aside some class time for nonacademic discussions.

Stage Fright

Still, students and teachers alike admit the technology can be intimidating at first. "When I think about the fact that what I say is bouncing off a satellite thousands of miles away, it's beyond my comprehension," says Becky Miller, a TI-IN English teacher. Miss Pawlick, the Dime Box student, says she too had a hard time adjusting to her TV classes. "The first time I asked a question, it felt weird because I knew people all over the state were watching my picture," she says, but adds that her initial apprehension is gone.

In some instances, class size can make participation virtually impossible. More than 700 students are enrolled in Oklahoma's satellite German class, so many of them have to ask questions through an electronic-mail system.

Nor does television teaching suit everyone's taste. One Dime Box student dropped one of her three TI-IN courses because she felt too isolated from her classmates. Polynet, a low-power system that links 17 schools in California, says about 30% of the students who sign up for its courses drop out. A Polynet official, however, says the difficulty of the college-level courses is to blame, not the fact that they are televised.

Because of the limitations of satellite-learning programs, educators stress that televised classes probably won't ever replace traditional teaching. "We're not able to deliver what we think works best, which is the teacher in the classroom, so we have to use an alternative," says William Kirby, commissioner of education in Texas. "But I don't think we'll ever find an alternative system that is better than the basic system itself."

People like Byron Welch, a social-studies teacher at Dime Box, hope Mr. Kirby is right. While he says he doesn't think his job is threatened by televised teaching in the immediate future, he admits, "Twenty years from now, I don't know. Hopefully, I won't be put out to pasture by a satellite dish."

Boston Globe Jan. 28, 1985

Study cites expansion of corporate education

Warns that traditional schools are being challenged

By Muriel Cohen
Globe Staff

American corporations now rival US colleges and graduate schools in the education business, according to a study released today by the Carnegie Foundation for the Advancement of Teaching.

The two-year study estimates that corporate schooling enrolls about eight million students and spends an estimated $40 billion annually. That equals the numbers and budgets of all the four-year colleges and universities in the nation.

Principals involved in the study warn that the rapid expansion of the corporate classroom challenges traditional colleges and universities that at one time controlled the market.

According to the study, corporations are offering a range of courses that frequently parallel those in more-traditional institutions, schedule them to accommodate employee timetables and, for the most part, charge the employee nothing.

This new kind of schooling offers everything from remedial English to PhDs in arcane sciences. And increasingly the courses are similar to those offered in a general college curriculum, with a liberal arts rather than a vocational bias, the study finds.

Employees can earn bachelor's, master's or doctoral degrees or take courses that qualify for college credits in a traditional institution, the report says.

The study's author, Nell Eurich, a member of the foundation's board, describes four kinds of corporate education ventures:

- In-house programs, institutes and seminars at the workplace, with a growing emphasis on basic skills and computers, management techniques, sales and service.
- New corporate-built facilities that look like college campuses, with dormitories, classrooms and other amenities.
- Degree-granting institutions, including programs offered by Arthur D. Little Inc. and Wang Laboratories Inc. in Massachusetts.
- A "satellite university" in Fort Collins, Colo., that will send instruction by satellite to classrooms across the country.

There are 18 full-fledged corporate postsecondary institutions offering bachelor's, master's and doctoral degrees, the study found, including several in the Boston area.

Local institutions

Among the local institutions are: the American Institute of Banking in Boston, which grants an associate's degree; Arthur D. Little Management Education Institute in Cambridge, master's degrees in administration and management; Boston Architectural Center in Boston, bachelor's degree; Massachusetts General Hospital Institute of Health Professionals in Boston, master's in science; and Wang Institute of Graduate Studies in Tyngsboro, master's in software engineering.

In a telephone interview, Eurich said most programs are offered free to employees except for some tuition reimbursement plans in which the corporation will pay costs as long as grades are maintained.

"Corporate education challenges higher education to clarify and reaffirm its mission," said Dr. Ernest Boyer, president of the Carnegie Foundation. But, he warned, "the danger is that, in a bid for survival, higher education will imitate its rivals, that careerism will dominate the campus as colleges pursue the marketplace goals of corporate education."

The study points out that under current tax law there is a 50 percent write-off of corporate education costs. "The other 50 percent is generally built into the price consumers pay for a product or service," Boyer said, adding that this is why these privately run programs are of public concern.

Advantages

While the foundation sees dangers in corporate education, there are also advantages.

"The typical collegiate calendar is caught in the lockstep of two semesters and four years. In corporate education, however, time is determined by educational purpose, not the other way around. Courses are flexibly arranged, varying in length from a few hours . . . to several months," the report says.

The foundation study recommends establishment of a Strategic Council for Educational Development to help set national policy for the next decade. "Without such continuing leadership no one scheme will suffice," says Eurich in her report. "Too many tactical proposals and short-range programs are being offered."

"Too often, business-based education operates in isolation. Programs of study are launched without reference to concerns beyond the organization," Boyer concludes. "At the same time, corporate education is a publicly supported enterprise. It must be viewed as a public trust. The public pays for such education at both ends – through a tax write-off and the price of goods and services."

The Chronicle of Higher Education April 24, 1985

Independent Study: a Bum Rap for Too Long

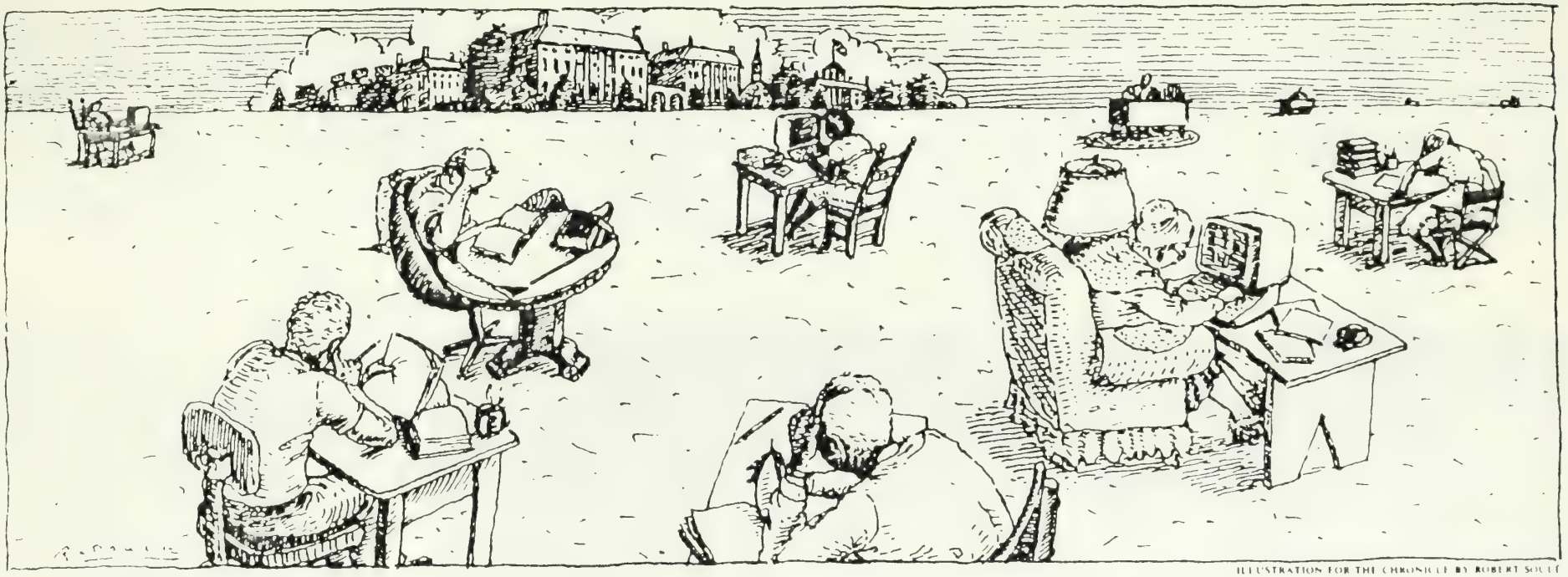


ILLUSTRATION FOR THE CHRONICLE BY ROBERT SOLT

DISTANCE LEARNING—a method of study by which a student learns independently while physically distant from the teacher and sponsoring institution—has been getting a bum rap for too long. Home study has existed for over a hundred years, and it has demonstrated that learning can indeed occur outside the familiar context of rows of desks at which young students dutifully take notes during 50-minute periods in an assigned room at an appointed hour every other day for 15 weeks.

However, despite the fact that the latest American Council on Education directory identifies more than 100 external degree programs at accredited institutions throughout the United States, this particular mode of learning is still viewed with considerable skepticism in many quarters. Despite the innovative educational programs and services that proliferated and gained acceptance in the 1960's and 70's, the term independent study still conjures up images of the diploma mills advertised on matchbook covers. And despite the involvement of first-rate faculty members and seasoned administrators, and the impressive academic accomplishments of adult learners in external undergraduate and graduate programs, many people connected with distance learning continue to be relegated to second-class status.

The harshest criticism of independent study frequently comes from colleagues who have vested interests in the established educational system in its more familiar form of classroom instruction. Yet once given the opportunity to participate in an alternative method of instruction these skeptics often become its strongest allies and advocates.

Admittedly, a good many of the programs that emerged during the past two decades were marginal and ultimately failed; others, although ill-conceived from the beginning, have managed to survive despite their mediocrity. But most external degree programs initiated during the period from 1960 to 1980 have endured and have made a substantial contribution to adult education in this country.

Distance learning, distinguished from other educational systems by the minimum constraints of time and space, has evolved in a variety of formats. Although a teacher is always involved, it is primarily a learner-centered system based on printed and electronically transmitted materials. Hence it differs from the so-called extension system, which generally means classroom-based instruction at a satellite site of the central campus. Distance learning, then, is non-classroom learning, usually through independent study directed

more—>

by a faculty member, and often leads to a degree.

Independent study has been criticized on the grounds that students need the stimulus of group learning; that instructors take too much time in responding; that students aren't motivated; and that too few of them complete a course of study. In fact, recent research indicates that independent students are stimulated to learn despite the absence of group interaction; that lessons are returned rapidly and telephone communication provides very adequate feedback; that mature, self-disciplined independent learners are highly motivated; and that course-completion rates among external degree candidates are exceptionally high.

It is curious that distance learning is often viewed as a relatively recent development when, in fact, correspondence courses were in use in this country as long ago as the 1870's; by 1892 the University of Chicago had established a home-study division. The National University Extension Association, including a division of correspondence study, was created in 1915, and the National Home Study Council was founded in 1926. During the next 50 years, some 55 million Americans took correspondence courses, and today approximately three million are studying by mail.

Most external degree programs developed by colleges and universities in recent years are a far cry from the original correspondence schools. Committed teachers, excellent materials, sophisticated technology, good quality control, substantial student services, and strong organizational support make external programs a desirable means of providing educational opportunity to ambitious adults.

Yet after decades of impressive growth, and despite the fact that enrollment in external degree programs accounts for the majority of the students at some institutions, these programs still have difficulty competing with traditional ones for an adequate share of institutional resources.

MUCH PREJUDICE STILL EXISTS against academic programs that do not conform precisely to the curriculum for full-time "day" students. Most faculty members are products of a conventional, classroom-based education, and many of them have little tolerance for nontraditional approaches. A common comment is, "Well, those new methods might be appropriate in some fields, but they certainly won't work in my discipline."

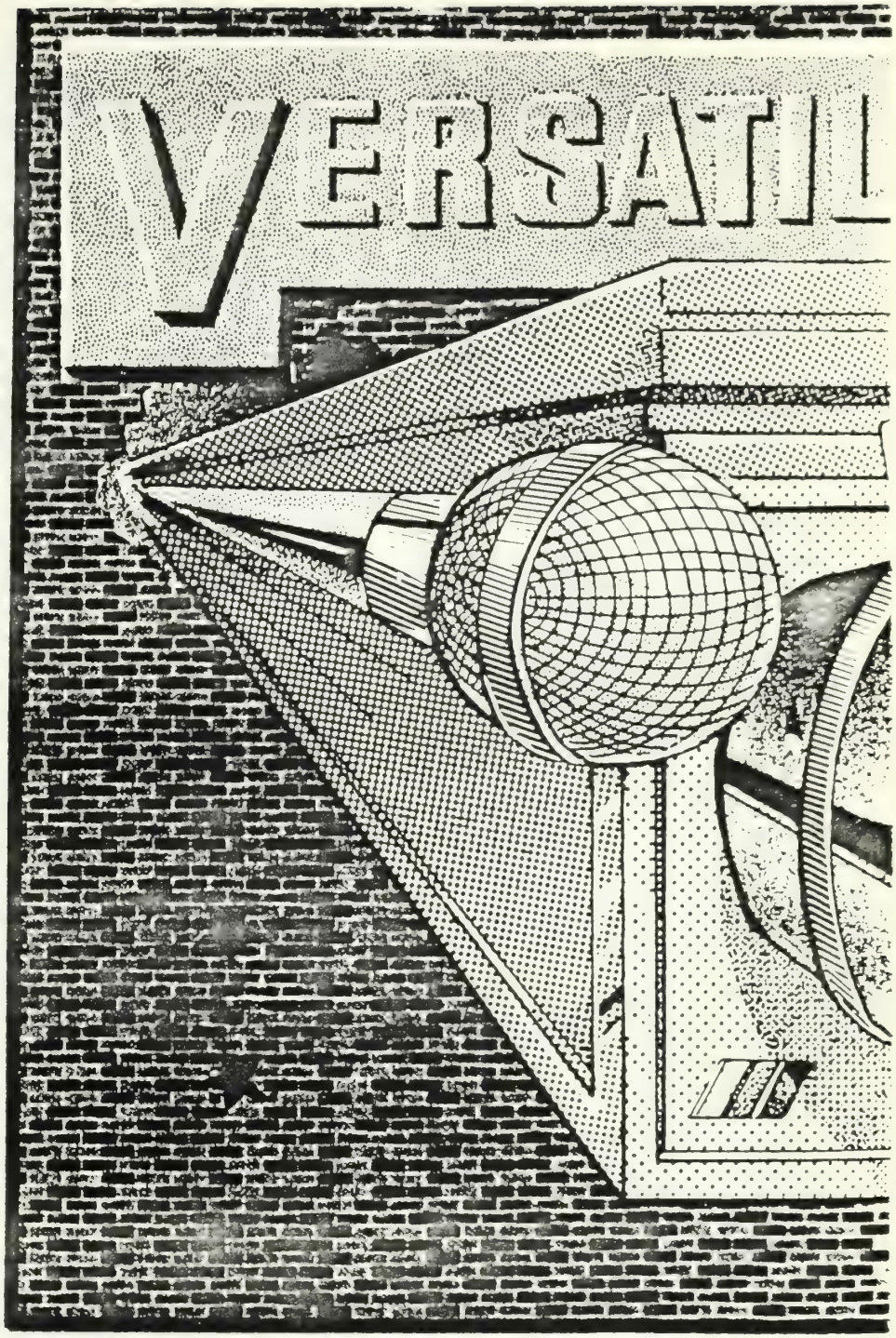
Even when external degree programs are tolerated, they often function as separate and unequal entities, set apart from the mainstream of the parent institution's administrative and academic enterprises. Those who advocate integration of traditional and non-traditional programs are actually attempting to absorb the newer ones into the "regular" program. This strategy often results in establishing identical requirements and procedures for both, thereby vitiating the rationale for offering alternative programs in the first place.

EXTERNAL DEGREE PROGRAMS suffer particularly at the hands of the agencies that review and regulate out-of-state institutions. Despite the presence of such programs in some form in virtually every state, they are still not widely accepted. Indeed, the proliferation of programs operating across state lines has hardened the posture of many states toward even well-established and highly regarded off-campus interstate programs. Although quality is usually cited as justification for the increased scrutiny, the review process often has overtones of hostility, especially if the programs have recruited large numbers of students and their tuition payments are leaving the state.

Distance learning has nevertheless established a major presence in the educational system of this country, despite institutional barriers and individual resistance. What remains to be done is to create a more permanent "bonding" with traditional academic enterprises. Alternative programs, if they are to survive within a larger institutional setting, must ultimately become institutionalized themselves, while still retaining their distinct character and purpose. There must be a greater awareness nationwide of the efficacy of distance learning, and those responsible for planning, administering, and evaluating external degree programs and other forms of independent study must develop a more adequate support system. External degree programs should collaborate to establish a set of rigorous standards, submit to review procedures based on those standards, and create a national mechanism for self-regulation.

There are many working adults in this country who want to continue their education, but haven't found an appropriate program that will enable them to do so without jeopardizing job security or neglecting family obligations. Distance learning can fill that gap, but it must be brought in from the cold and given its due as a legitimate option for adults who want to continue to learn but cannot do so within a traditional program.

Michael F. Beaudoin is dean of continuing education and external degree programs at Saint Joseph's College in Maine



Move Over MTV
Videtaped Interverviews as an Educational Medium

By Judith B. Chandler

The potential that lies within the use of video equipment for educational purposes is limited only by the imagination of intrepid educators. Today's students are familiar with video equipment and its output. They are comfortable before and behind the camera. The prevalence of VCRs and MTV, for example, means that video is as user friendly to young people as is the telephone and rock music.

Once when I was punching up a student's midterm average on my at-that-time state-of-the-art calculator, I commented on how much easier these gadgets had made a formerly onerous task.

The student looked at me in amazement to think that I stood before him—a person older than calculators. Yes, and older than MTV, too, and considerably older than Michael Jackson.

Whole new worlds of technology are accessible to us daily. I type on a home computer, listen through intercoms to my sleeping children, indulge in taped novels as I travel, and own a machine to answer my phone when I'm not at home (or pretending not to be).

While these innovations have streamlined and (sometimes) simplified my personal life, in a more important way the new technology of our "high tech/high touch" society, as I am learning to call it, is also revolutionizing the methods through media available to educators.

Admidst all this technological change, two educational principles recognized and generally acknowledged since the time of Socrates are:

• ***Education should simulate life.*** As Knowles has written, "People become ready to learn something when they experience a need to learn it in order to cope more satisfyingly with real-life tasks or problems....They want to be able to apply whatever knowledge and skill they gain today to living more effectively tomorrow." The closer what is happening in the classroom is to what is happening and what is expected (in this rapidly changing world) to happen in "real life," the more effective the learning experience and its later application in students' lives are bound to be.

• ***Students should be active participants in the learning process.*** As the authors of *The Audio-Tutorial Approach to Learning* state, "It is necessary to create an environment in which the learner is motivated to become involved in the process," or "...the learning must be done by the learner." The ancient "mug and jug" method just doesn't hold water (pardon the metaphor). For learning both inside and outside the classroom to be optimally effective, students need to be involved in the planning, the process, and the evaluation.

One educational method based on guided self-activity that is just now com-

continued on page 24

Judith B. Chandler is an editor, a writer, and Adult Education Specialist at the Instructional Resources Center at the office of Instructional Development, University of Georgia. She acknowledges the assistance of Carl M. Scott, Communications Production Manager at the University of Georgia who was in charge of the "Mentors II" project and who cooperated in preparing this article.

X: A complex assignment utilizing experts, excellent taping facilities, and X amount of dollars.

Y: You and your students plan and execute a class taping project combining some expertise and lots of creative energy with you as the producer and director.

Z: Zoom—off your self-directed students go, fueled by their own enthu"z'iasm to interview subjects individually.

continued from page 20

ing into its own, and which contemporary technology and increased availability of funding sources and equipment have made accessible to classroom teachers, is the use of videotape interviews to enable student learners to capture "real people" live and in action. The taped interview, from both the students' and the teacher's perspectives, combines these two ancient qualities of vitality and involvement and is an effective but sadly and needlessly neglected instructional tool.

Three projects that I have labeled X,Y, and Z are described below. They demonstrate three levels of sophistication in the use of the video interview in the classroom and provide examples of how the "average" classroom teacher can launch similar projects to enhance students' learning at almost every grade level and in almost every subject area through participation in such an innovative—but relatively simple—technique.

Project X, "Mentors II," was a sophisticated project in which an academic department at a major university combined forces with the resources of the staff of a highly skilled Media Center to tape a series of individual and group sessions with leading mentors in the international field of adult education. Ten prominent adult educators were brought to the University of Georgia campus in the spring of 1984 in a joint project (under the direction of esteemed educator Curtis Ulmer) of the Department of Adult Education and the Instructional Resources Center of the University. Ten 30-minute individual and three 30-minute group sessions were videotaped, all of which are now in distribution. Plans are already underway for Mentors III in 1994. (Persons interested in additional information on these tapes should contact The Instructional Resources Center, The University of Georgia, Athens, GA 30602.)

Project Y is a group project that was implemented by a middle school teacher and was carried out in a class effort to prepare taped reminiscences (much in the spirit of the popular *Foxfire* series) of patients in a local nursing home, in conjunction with the school's commemoration of Black History Week. This project, unlike the first, was set in motion by informed amateurs not media professionals, and did not rely on sophisticated equipment, advice, or expertise. However, the basic components and the learning outcomes of this project were quite similiar to those of "Mentors II."

Project Z, by far the least complicated undertaking, combined a series of individual or self-directed video projects in which late-elementary school children were provided with both supervision and video equipment to interview professionals in their local community as part of a careers unit. Ten-minute interviews with local lawyers, doctors, firepeople, telephone installers, principals, and newspaper reporters provided these fifth graders with graphic pictures of what they might want to be "when they grow up."

According to John Stephens, Jr., Director of the Instructional Resources Center at the University of Georgia, "As the cost of equipment has lowered and the quality of the picture produced by the equipment has improved, acoeptable videotaping is now in the reach of virtually any school (or teacher)." Stephens notes that even if video equipment is not available in a given school's AV center, it often can be easily obtained elsewhere within the school from a music teacher or a coach (who uses it for reviewing game films), or by request from the PTA. If video equipment is not available in the school itself, community resources can be tapped—for example at the public library or through a church. Additionally, students themselves may possess video equipment in their homes. Students' expertise with VCR's can be impressive.

Several significant points are noteworthy on the subject of video interviews for classroom use and are true of the projects noted above:

1. ***Why tape interviewers in the first place?***

Seeing is better than hearing or reading second-hand. Seeing a famous scientist or a local politician speak carries far greater clout than reading a Nobel Prize acceptance speech or a campaign pamphlet. The student cameraperson or viewer reflects, "Could I be an influential scientist?" or "Would I buy a used car from this woman?"

2. ***Why should students be involved in the taping process?***

The more a student feels that the experience is personal, that he or she has a role in shaping it, the more the student will take pride in the final product—and perhaps remember and apply the learning later.

3. ***What will students learn from such taping projects?***

The list is long: Research techniques, the application of research to practical endeavor, interpersonal skills, interview techniques, editing (of both print and video materials), and the all-important process of goal-setting, planning, implementing, and evaluating a project. It is expected that, as in any learning transaction, there will be some serendipidous results: The surprising achievements of former ne'er-do-wells, cooperation among rivals, newly discovered talents—a budding Barbara Walters or Dan Rather Most importantly, students may be lured across the line that separates what is happening now in Civics 100 and Biology 140 from what they perceive as *life*. If students cannot see that education is about life and that life is now, not "when I graduate," then we are failing as teachers, administrators, and media people.

4. ***What kind of equipment is needed?***

Obviously, a camera, videotape recorder, and microphone are the bare essentials. Multiple cameras, a switcher, mike mixer, studio lighting, and editing capabilities can each lend a degree of professionalism to your finished product. Some method of titling and adding credits also is necessary, if for no other reason than to give the students credit on the tape for their work. This method could be in-camera generated graphics, which is a common capability of many of the newer cameras; a separate character generator tied into an editing system; or simply training the camera on a hand-lettered sheet of paper.

5. ***What kind of media expertise and training is required?***

The more sophisticated the equipment, the more advanced the expertise must be to operate it. For a simple, one-camera set-up, a few hours of training and practice by the students, plus a good instruction manual for the teacher, can produce surprisingly professional results. Unlike many class projects, the students should not require constant supervision. For all its technological intricacies, video equipment is rugged and reliable. If reasonable care is exercised by the students, they should be capable of handling the actual taping of interviews with very limited supervision.

6. ***What educational applications can be made of these taped interviews?***

Granted, the most important educational benefit will be experienced by the students and teachers involved, but there are many creative ways in which these classroom tapes can be utilized. Here's just a few: Show the tapes at PTA Meetings as examples of innovative teaching techniques in use at your school, use them as demonstrations of "what's right with our schools" at the Chamber of Commerce or in crowded mall exhibitions; take them to professional meetings to show along with the presentation of research papers; show them to special parent assemblies or at the

continued on page 52

Move Over MTV

continued from page 24

next bond referendum rally. Or, take a tip from the Little Rascals movie and "put on a show"—let these students and their parents know how really proud of them you are.

What are the basic steps that a classroom teacher needs to keep in mind if he or she decides to take a stab at using the video interview method? Although each video interview project is unique, here's a basic guide:

- *Knowledge and need.* Students require a sound foundation before the camera rolls. Also, there must be a good reason for the project. If you are studying various occupations, as in Project Z, your students need basic career information so that they can select appropriate subjects, write pertinent questions, and draw intelligent conclusions and applications from the finished tapes.
- *Motivation.* The teacher's enthusiasm is contagious to the student and vice versa. In this case, MTV is on your side, and students are primed to give a new idea and new techniques a try. This is one time that an adult will not be telling them to "turn it off" or "turn it down." We all take pride when we see our names in the credits of any production.
- *Research.* In projects like these, research is lifted out of the dusty pages of books and is carried out actively as students interview, take notes and consult with media experts. Research ceases to be an end in itself and becomes an exciting means to a visible end—"my" videotape.
- *Planning, Execution, and Editing.* As the project develops from the first idea to the final on-screen product, students are able to actually *see* the relationship between ideas and actions and are able to envision their roles in this on-going process. Here is a concrete way in which students can really realize that, as individuals, they can make a difference and can learn to weigh their successes and their mistakes and have an opportunity to correct the latter.
- *Evaluation.* The end result of the learning cycle in a video project, whether it be like X, Y, or Z, can be evaluated by the media professional, the teacher, the student, or the audience. While the main satisfaction is a private and internal one, the lessons demonstrated can benefit all involved. Best of all, at least this one time, the student can erase the tape and start all over again.

Allen Tough is a researcher who has studied thousands of learners engrossed in self-directed learning projects. What he has learned about the outcomes of these projects serves as an apt conclusion to what we can expect will be the outcome of student video projects like those described above. Tough found that the immediate and intended outcomes were coupled with results that were not just "intellectual, cognitive, and material." Many outcomes, he discovered, were "emotional or psychological, including pleasure, satisfaction, self-esteem, impressing others and receiving praise"—not bad outcomes through any method for learners at any level. This may be the student's chance of a lifetime to see his or her name up in lights. And remember, you were the author, director, and producer who set it all in motion. ■

ITV: Alive in the Classroom

by Mary Jo Hafner

Introducing an instructional tool to the education environment, currently innundated with new technologies, is a challenging prospect. Traditional teaching tools that are tried and true often inhibit acceptance of new tools in the classroom. Television as a tool for learning is tricky business. It's not new. It's been tried. It's not always true. Educational TV conjures up images of the "TV lecture" used to plug students in a classroom into viewing a classroom on TV. But new developments in instructional television (ITV) are helping to take the "classroom" out of television, not television out of the classroom.

ITV: A New Beginning

Unlike educational TV of the past, the Central Educational Network (C.E.N.) presents instructional television series that are slick with substance. Via Satellite, C.E.N. delivers nearly 70 different ITV series that address virtually every curriculum area at every grade level. Computer graphics, animation, time lapse and slow motion photography, and on-location video bring the outside world into the classroom in an upbeat, fast-paced style which students have been trained to expect from television. Program objectives and pre- and post-viewing activities are packaged in teacher guides accompanying every ITV series.

Why ITV?

Instructional television of such high caliber has prompted the state of Michigan to keep television in the classroom. In his 1984 State-of-the-State address, Michigan's Governor James Blanchard called for an investigation of the implications of cable television in education, guidelines for its effective use and assistance to realize cable's potential. Michigan's answer to the Governor's plea was the birth of M-STAR.

The Michigan Statewide Telecommunications Access to Resources (M-STAR) project is a network of four regional educational media centers (REMC's). These centers collectively manage the availability of ITV to every student in Michigan. Funded by a grant from the Michigan Department of Education state discretionary funds, M-STAR has obtained a statewide subscription to the C.E.N. instructional television programming.

TV/Teacher Partnership

High quality instructional television alone is not the answer to keeping television in the classroom. Television's power as a tool for learning needs to be managed. Developed via one of four local video utilization grants awarded by the state of Michigan, the Birmingham Instructional Cable Utilization Project (BICUP) is a model developed in the Birmingham School District for effective utilization of instructional television. BICUP seeks not only to keep television in the classroom but to train teachers *how to* use television effectively. Training "masters" of ITV is what BICUP is about.

By virtue of their leadership and interest in innovation, forty teachers were selected to become initial participants in BICUP. Their commitment to the project involved:

- Previewing and selecting C.E.N. programming appropriate to their curriculum needs.
- Utilizing ITV a minimum of twelve times during the model school year.
- Attending four training sessions to learn effective ITV utilization techniques.
- Cooperating with classroom observations and interviews for model evaluation.
- Sharing ITV perceptions and experiences with fellow staff members.

To truly be master of this instructional tool, the teacher must determine television's role in his/her class. BICUP teachers are taught to ask themselves one question before turning on the TV set - *will the program do something that I, as teacher, cannot do?* If so, then and only then, should television play a role in their lesson.

What is it that ITV can do? Instructional television harnasses the power of television to stimulate, motivate and focus the student's attention on a subject. Animation, music, computer graphics and dramatizations offer an alternate method of introducing, reviewing and reinforcing concepts difficult for the student to comprehend.

But for all its visual dynamism, ITV is not a lesson by itself. Like any vehicle, without a driver to steer it, it goes nowhere. Pre- and post-telecast activities are crucial to ITV's usefulness in the classroom. Only the educator can establish the purpose for viewing and follow-up with the meaning of the lesson. It is then that critical thinking skills are sparked in the student.

Delivering the Goods

Another innovation in using TV in education is the use of new technology for delivery. A number of delivery systems can send ITV programming to the classroom. Satellite dishes, microwave, ITFS, closed circuit and cable television can all carry a television signal to any destination equipped to receive it.

In Birmingham, Booth Communications (the local cable company), wired every classroom with a dual cable outlet in each of the school district's sixteen schools. This allows for delivery of programming from both the subscriber network and the institutional network (I-NET) to each of the more than 7000 Birmingham students. the I-NET consists of a "mini" cable system, separate from the subscriber network, that connects all schools and municipal buildings

to one another in the franchise area. Typically, an I-NET is designed to allow for communication of a specific nature to be directed to a specific audience. Hence, the I-NET is a natural delivery system for instructional television.

Getting the instructional programming from C.E.N. to the I-NET involved a broad use of technologies. C.E.N. programming is uplinked in Columbia, South Carolina to the satellite Westar IV. The signal must then be received by a satellite dish somewhere within a range transmittable to Birmingham. Although M-STAR assists all Michigan schools to tap into C.E.N. programming, Birmingham, was committed to a timeline in beginning utilization of ITV and opted to receive the signal from the Archdiocese of Detroit, where reception facilities were in place. The Archdiocese is licensed to carry three ITFS channels, one of them designated for C.E.N. programming. In exchange for Booth delivering all three ITFS channels to the parochial schools in their cable franchise area, the Archdiocese makes C.E.N. programming available to the public schools as well.

Receiving the C.E.N. signal at their earth station at the Sacred Heart Seminary in Detroit, the signal is then microwaved on a one-way, single path microwave frequency to a receiving dish seven miles away. The receiving dish strips the microwave signal and feeds it back in usable form to the transmitter. A wave guide then takes the signal from the transmitter up to the tower to an antenna. From the antenna, the C.E.N. programming is microwaved to a receiving dish at the Booth cable television headend. The microwave signal is then converted to a usable VHF band channel and sent out over the I-NET to all classrooms in the Birmingham School District.

For education, television is an answer to an instructional need. Using new technologies to deliver it to the classroom puts the educator in touch with a valuable new resource. Television has captured the child's attention - it's time to make it work in education.

—Mary Jo Hafner is Educational Cable Consultant with Booth Communications for Birmingham (MI) Public Schools.

APPENDIX D

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Hon. Paul A. Tamburello, Justice
Massachusetts Superior Court

Charles C. Tretter, Esq. Gen. Counsel
New England Governor's Conference

Richard A. Borten
Executive Director

James E. Samels, Esq.
Secretary

Charles W. Smith
Treasurer

APPENDIX E

KMG Main Hurdman

Certified Public Accountants

MASSACHUSETTS CORPORATION FOR EDUCATIONAL TELECOMMUNICATIONS

FINANCIAL STATEMENTS
WITH ACCOMPANYING INFORMATION

YEARS ENDED JUNE 30, 1986 AND 1985

and

REPORT OF CERTIFIED PUBLIC ACCOUNTANTS

MASSACHUSETTS CORPORATION FOR EDUCATIONAL TELECOMMUNICATIONS

FINANCIAL STATEMENTS
WITH ACCOMPANYING INFORMATION

Years Ended June 30, 1986 and 1985

TABLE OF CONTENTS

	Page
Accountants' Report on Financial Statements	1
Financial Statements:	
Balance Sheet	2
Statement of Support, Revenue and Expenses and Changes in Fund Balance	3
Statement of Changes in Financial Position	4
Notes to Financial Statements	5 - 6
Accompanying Information:	
Accountants' Report on Information Accompanying the Basic Financial Statements	7
Statement of Expenses	8

KMG Main Hurdman

Certified Public Accountants

One Boston Place
Boston, MA 02108

Telephone: (617) 723-3030
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The Board of Directors
Massachusetts Corporation for
Educational Telecommunications

We have examined the balance sheet of Massachusetts Corporation for Educational Telecommunications as of June 30, 1986 and 1985, and the related statements of support, revenue and expenses and changes in fund balance, and changes in financial position for the years then ended. Our examinations were made in accordance with generally accepted auditing standards and, accordingly, included such tests of the accounting records and such other auditing procedures as we considered necessary in the circumstances.

In our opinion, such financial statements present fairly the financial position of Massachusetts Corporation for Educational Telecommunications at June 30, 1986 and 1985, and the results of its operations and the changes in its financial position for the years then ended, in conformity with generally accepted accounting principles applied on a consistent basis.

KMG Main Hurdman

July 25, 1986

MASSACHUSETTS CORPORATION FOR EDUCATIONAL TELECOMMUNICATIONS

BALANCE SHEET

June 30, 1986 and 1985

	1986	1985
ASSETS		
Current assets:		
Cash and cash equivalents	$247,477	$163,617
Accounts receivable		6,565
Interest receivable	1,169	1,034
Prepaid expense	2,964	4,757
Total current assets	251,610	175,973
Equipment	21,979	8,785
Less accumulated depreciation	4,678	1,603
	17,301	7,182
	$268,911	$183,155
LIABILITIES AND FUND BALANCE		
Current liabilities:		
Accounts payable	$ 16,657	$ 5,062
Accrued expenses	23,488	33,485
Estimated payroll taxes payable	52,280	29,778
Deferred restricted support	10,683	
Total current liabilities	103,108	68,325
Fund balance	165,803	114,830
	$268,911	$183,155

The accompanying notes are an integral part of these financial statements.

MASSACHUSETTS CORPORATION FOR EDUCATIONAL TELECOMMUNICATIONS

STATEMENT OF SUPPORT, REVENUE AND EXPENSES
AND CHANGES IN FUND BALANCE

Years Ended June 30, 1986 and 1985

	1986			1985
	Unrestricted Funds	Donor Restricted Funds	Total	Unrestricted Funds
Support and revenue:				
Grant revenue	$377,000	$407,180	$784,180	$482,000
Interest income	25,506		25,506	15,191
Consulting fees	13,564		13,564	6,565
Other income	136		136	1,198
Total support and revenue	416,206	407,180	823,386	504,954
Expenses:				
General and administrative costs	365,233		365,233	362,000
Consulting		407,180	407,180	
	365,233	407,180	772,413	362,000
Excess of revenue over expenses	50,973	$ -0-	50,973	142,954
Fund balance (deficiency), beginning of year	114,830		114,830	(28,124)
Fund balance, end of year	$165,803		$165,803	$114,830

The accompanying notes are an integral part of these financial statements.

MASSACHUSETTS CORPORATION FOR EDUCATIONAL TELECOMMUNICATIONS

STATEMENT OF CHANGES IN FINANCIAL POSITION

Years Ended June 30, 1986 and 1985

	1986	1985
Resources provided from:		
Excess of revenue over expenses	$ 50,973	$142,954
Add charge not affecting resources:		
Depreciation	3,075	1,241
Total resources provided from operations	54,048	144,195
Increase (decrease) in accounts payable	11,595	(1,535)
Increase (decrease) in accrued expenses	(9,997)	26,303
Increase in estimated payroll taxes payable	22,502	29,778
Increase in deferred restricted support	10,683	
Total resources provided	88,831	198,741
Resources used:		
Increase (decrease) in accounts receivable	(6,565)	6,565
Increase in interest receivable	135	1,034
Increase (decrease) in prepaid expenses	(1,793)	2,428
Acquisition of equipment	13,194	5,169
Increase in loans payable		25,000
Total resources used	4,971	40,196
Increase in cash and cash equivalents	$ 83,860	$158,545
Cash and cash equivalents, beginning of year	$163,617	$ 5,072
Cash and cash equivalents, end of year	247,477	163,617
Increase in cash and cash equivalents	$ 83,860	$158,545

The accompanying notes are an integral part of these financial statements.

MASSACHUSETTS CORPORATION FOR EDUCATIONAL TELECOMMUNICATIONS

NOTES TO FINANCIAL STATEMENTS

1 - Organization

Massachusetts Corporation for Educational Telecommunications (MCET), a quasi-public corporation, was created by the state legislature in December 1982 under Chapter 560 of the Acts of 1982. MCET's purpose is to develop a state wide telecommunications network to meet the telecommunications needs of various public and private organizations within the Commonwealth of Massachusetts. MCET is supported by a grant from the Commonwealth of Massachusetts and contributions, grants, gifts and bequests from the private sector. Although MCET is placed within the University of Massachusetts, it is not subject to the control of the University or any other state agency within the Commonwealth. MCET is governed by an independent board of directors; twelve members are appointed by the Governor of the Commonwealth and six members are designated by the Massachusetts legislature.

2 - Summary of Significant Accounting Policies

Fund Accounting

To ensure adherence to limitations and restrictions placed on available resources, the accounts are to be maintained in accordance with the principles of fund accounting. Those funds restricted as to purpose and use are accounted for separately from funds available for general corporate use. Donor restricted funds represent funds restricted by the donor for particular development purposes and are deemed to be earned and reported as support when MCET has incurred expenditures in compliance with the specific restrictions. Such amounts received but not yet earned are reported as restricted deferred support. Unrestricted funds represent the portion of expendable funds that are available for all MCET expenses.

Equipment

Equipment is stated at cost, or in instances of donation, at fair market value. Depreciation is recorded using the straight-line method over the estimated useful life of the assets.

Income Taxes

MCET is applying for exemption from Federal and state income taxes under IRC Section 115(1) as an instrumentality of the Commonwealth; therefore, no provision for Federal and state income taxes has been included in these statements.

Donated Services

During 1986 and 1985, MCET received donated office space and support services from the Commonwealth of Massachusetts. Donated services are recorded on the financial accounts when a fair value for such services can be ascertained and when the services donated replace services which would otherwise be provided by employees. No income or expense was recorded in the accompanying financial statements as the value of such services could not be readily ascertained.

MASSACHUSETTS CORPORATION FOR EDUCATIONAL TELECOMMUNICATIONS

NOTES TO FINANCIAL STATEMENTS
(Continued)

2 - Summary of Significant Accounting Policies (Continued)

Revenue Recognition

Support and revenue in the form of grants and donations are recorded when use of the cash or other donated assets is available to MCET.

3 - Estimated Payroll Taxes Payable

MCET has, as of this date, not yet received the IRS Ruling confirming its status as a public instrumentality of the Commonwealth (see Note 2 - Income Taxes); therefore, a provision for payroll taxes has been included in the financial statements. A regulation in the Federal Insurance Contributions Act Subtitle C Chapter 21 of the Internal Revenue Code requires that all employees are subject to FICA taxes. The provision for estimated payroll taxes in the amount of $52,280 represents the estimated liability for both employer and employee contributions for the last three fiscal years, individually and cumulatively, as follows:

	1986	1985	1984	June 30, 1986
Employee	$11,251	$10,404	$4,299	$25,954
Employer	11,250	10,585	4,491	26,326
	$22,501	$20,989	$8,790	$52,280

4 - Simplified Employee Pension Plan

MCET has adopted a simplified employee pension plan whereby a contribution equal to 10% of an employee's eligible wages (as defined by the plan) is contributed to a retirement account in that employee's name on a quarterly basis. Pension expense for the year ended June 30, 1986 and 1985 was $19,113 and $16,180, respectively.

5 - Leases

MCET's future minimum rental commitments under operating lease agreements for automobile and equipment as of June 30, 1986 amount to $3,226 for 1987.

6 - Restricted Grants

In September 1985, MCET received a grant by a local university to provide $1,250,000 for consulting services in an effort to secure Federal support for the development of the telecommunications network and supporting facilities essential to this development. The agreement provides for monthly payments of $41,667 for 30 months or completion of the project whichever is sooner. At June 30, 1986 the remaining balance was $833,333.

ACCOMPANYING INFORMATION

ACCOUNTANTS' REPORT ON INFORMATION ACCOMPANYING THE BASIC FINANCIAL STATEMENTS

Our examinations of the basic financial statements presented in the preceding section of this report were made for the purpose of forming an opinion on such financial statements taken as a whole. The accompanying information is presented for purposes of additional analysis and is not a required part of the basic financial statements. Such information has been subjected to the auditing procedures applied in the examinations of the basic financial statements, and, in our opinion, is fairly stated in all material respects in relation to the basic financial statements taken as a whole.

KMG Main Hurdman

Boston, Massachusetts
July 25, 1986

MASSACHUSETTS CORPORATION FOR EDUCATIONAL TELECOMMUNICATIONS

STATEMENT OF EXPENSES

Years Ended June 30, 1986 and 1985

	1986	1985
General and administrative:		
Salaries and wages	$171,085	$186,596
Payroll taxes	22,501	29,779
Pension	19,113	16,180
Professional fees	5,950	5,000
Equipment leasing	4,987	5,025
Travel and entertainment	4,968	2,950
Insurance - group	13,896	7,102
Insurance - other	4,435	4,777
Meetings	46	221
Telephone	5,312	4,852
Office supplies	3,010	2,992
Meetings and conferences	313	965
Repairs and maintenance	1,669	1,422
Printing and stationery	2,045	2,312
Insurance - life	1,288	1,235
Depreciation	3,075	1,241
Periodicals and books	1,476	1,078
Petty cash	309	236
Dues and subscriptions	633	
Postage	519	374
Tuition reimbursement	1,260	
MCET - related programs	2,087	
Miscellaneous	3,856	2,581
Consulting services	91,400	85,082
	$365,233	$362,000
MCET Development Trust Fund:		
Consulting	$407,180	

APPENDIX F

THE COMMONWEALTH OF MASSACHUSETTS

CORPORATION FOR EDUCATIONAL TELECOMMUNICATIONS

McCormack Building / One Ashburton Place / Boston, MA 02108 / (617) 727-6286

Chancellor John B. Duff

Richard A. Borten

BOARD OF DIRECTORS

Meeting of September 23, 1985

MINUTES

The seventeenth meeting of the Board of Directors of the Massachusetts Corporation for Educational Telecommunications was held on Monday, September 23, 1985 in Conference Room #1 of the McCormack State Office Building in Boston.

Directors in attendance were:

Chairman John Duff; Henry Becton; William Cantor; Dr. Jonathan Daube; Helen A. Donohue,Esq.; Dr. David Knapp; Mayor Richard Neal; Dr. John Silber; Richard Snyder,Esq.; and Judge Paul Tamburello.

Also present were Executive Director Richard Borten; Secretary Pro-tem James Samels,Esq.; Richard Connell representing Treasurer Charles Smith; Megan Jones representing Secretary Evelyn Murphy; Don Mikes representing Father J. Donald Monan; John LeBaron representing Commissioner Lawson. In attendance, too, were Dr. Russel Jones of Boston University; Kevin Crain of UMass; Estelle Shanley and Joyce Kirby, Esq. of the Board of Regents; and Ruth Ferguson, Martin Kessel, Abbie Goodman and Ruth Ballinger of MCET.

The Chairman called the meeting to order at approximately 10:15 a.m. Upon motion duly made and seconded, the Minutes of the previous meeting were accepted as submitted.

REPORT OF THE CHAIRMAN

Chairman Duff reported that MCET's FY 86 budget allocation is $677,000. The Secretary of Administration and Finance has stipulated, however, that the $300,000 increase over last year's appropriation will be released only after his review and approval of a plan to be submitted to him by MCET indicating that the funds will be spent on the utilization of existing telecommunications capacity for the delivery of educational services, and providing detailed information as to the costs and revenues associated with this activity. Chairman Duff instructed Mr. Borten to prepare such a plan as soon as the terms and conditions for the use of available existing telecommunications capacity are known.

The Chairman distributed to the Board copies of the Fiscal Year 1987 budget request for $729,289 (see Attachment A). This amount is an increase of 7.7% over the FY 86 allocation of $677,000. The state's overall budget increase target for FY 87 is 7%, so MCET's proposal appears to be in line.

REPORT OF THE TREASURER

Richard Connell presented the audited financial statements of MCET for the years ended June 30, 1985 and 1984 on behalf of Treasurer Charles Smith. The audit was prepared by the independent accounting firm, KMG Main Hurdman. The report of the Treasurer was unanimously accepted upon motion of President Daube and the second of Mr. Snyder.

REPORT OF THE EXECUTIVE DIRECTOR

The Executive Director presented a "State of the Corporation" report on what MCET has done to date and where he sees the Corporation at this time.

Mr. Borten noted that during the Corporation's first operational year, it sought to focus the extraordinarily broad mandate of the enabling legislation and answer the questions set forth in our First Year Work Plan:

- What communications services are needed by various Massachusetts institutions? What services could and should MCET provide? What telecommunications capacity exists in the Commonwealth; what could we use to serve as part of the mandated network?

- What have been the experiences of similar agencies in other states?

- What are the economics associated with developing and operating a system?

During this period MCET also conducted a comprehensive assessment of institutional telecommunications needs in the Commonwealth and examined a wide range of alternative telecommunications technologies.

By September 1984, although the Corporation's first year research was not complete, the staff had answers to many of these questions. It had confirmed that an information economy is vital to Massachusetts and that its future is dependent on effective telecommunications systems; and that other states are agressively pursuing both high tech industry and the development of advanced telecommunications capacity. Mr. Borten cited the marketing of continuing education video courses to Massachusetts hospitals by such out-of-state institutions as Dartmouth Medical School and Memphis Memorial Hospital (while no such courses are being marketed by Massachusetts's four medical schools and many leading hospitals) as an example of the leadership opportunities the Commonwealth is losing due to a lack of affordable and accessible telecommunications systems.

It was already clear by the September 1984 meeting that there is a definite market for telephone and data transmission among the state's institutions, and a much less certain market for video transmission capacity. (The staff noted at that time that Massachusetts institutions might never move towards the use of advanced video capacity without an opportunity to experiment with such capacity.)

At the September 1984 meeting, the Board authorized moving forward with development of a plan wherein MCET would serve as provider of video capacity, as provider of data capacity, as consultant to institutions on the uses and development of such capacity, and to extent possible, as bulk purchaser/re-seller of discount telephone capacity. The Board also approved and authorized proceeding with development of first stages of a network by seeking to secure maximum existing capacity (including WGBH's, BCTV, cable capacity, etc.) and bridging that capacity with our own facilities.
Mr. Borten noted that during this period the staff also began helping institutions, on both a paid and pro bono basis, to address specific communication problems. Among the consulting projects MCET has undertaken are:

Work with UMass in the acquisition of a satellite uplink and the planning and development of a campuswide cable communications system;

Work with the University of Lowell on a video project serving five local school districts;

Work with the Massachusetts Commission for the Blind on acquiring low cost audio capacity for the distribution of a news reading service for blind and print disabled citizens;

Report of the Executive Director (cont'd.)

Work with Boston University on the acquisition of satellite transmitting facilities in Western Europe;

Organizing and leading users and operators of instructional television fixed service (ITFS) capacity in Massachusetts; and

Work with Southeastern Massachusetts University on the acquisition of ITFS licenses.

The Executive Director noted that in April 1985 the Board received and reviewed a Draft Plan which recognized the fiscal reality that the state would not support the development of a full scale network and suggested that MCET begin network development by creating a $2.7 Million voice, data, and video link on DPW towers between Boston and the Pioneer Valley with a spur to Worcester. However, the Executive Office of Administration and Finance opposed this Plan. As the Chairman noted, Sec. Keefe has stipulated that additional funding contained in our budget will only be released after his review and acceptance of a plan for the use of existing telecommunications capacity. This is consistent with the position Sec. Keefe articulated in correspondence to President Silber and to the Board through David Bernstein. A&F's view has been that:

a) MCET must more specifically identify a clear and viable market for the services specified in its enabling legislation:

b) The state should not fund the development of a telecommunications network until a market is proven and MCET should not develop capacity of its own; and that

c) MCET should concentrate on utilizing existing capacity, particularly WGBH's video transmission capacity between Boston and Springfield to test and demonstrate such a market

It is also A&F's position that the state already has a means of transmitting voice and data signals and that the telecommunications network mandated in our legislation was intended for instructional purposes.

In keeping with A&F's position that the Corporation's service activities should commence with the use of existing capacities, MCET has aggressively explored the use of virtually all existing capacities, including the SportsChannel, Eastern Microwave, various satellite services, the proposed UMass Uplink, ITFS capacity and the House of Representatives and WGBH inter-city relay systems.

Mr. Borten reported that after a full summer of negotiations, MCET and WGBH have reached agreement in principle on a renewable two year arrangement for MCET's use of the House of Representative s and WGBH s inter-city relay systems. Such an agreement would give MCET:

Priority use of both the House and the WGBH inter-city relay systems between Boston and Springfield (each of which carries an East-to-West and a West-to-East channel);

The role of exclusive broker for use of this capacity by Massachusetts educational, health care and other non-profit institutional uses;

Authority to schedule and set rates for the use of this capacity by its clients;

The ability to insert and tap-off signals at various relay points in the network; and

An agreement that MCET and WGBH will work together to expand or extend the system.

Report of the Executive Director (cont'd.)

Mr. Borten noted that while MCET and WGBH still disagree over price and several other factors, the organizations should reach final agreement shortly. He said the next step will be for attorneys representing MCET and WGBH to craft a formal contract for our use of the capacity, and for the MCET Board or Executive Committee to review and approve this contract.

Mr. Borten noted, too, that the Scientific Atlanta Company has contributed a steerable satellite uplink to be located at UMass/Amherst and available to MCET and its client agencies. However, funds are still needed for the electronic equipment that is an essential part of such a facility. Borten expressed his view that such an uplink will be a crucial part of the MCET network and asked that the Board authorize his negotiating a part ownership role in the uplink for MCET with a maximum investment of $50,000.

The Executive Director said that the combination of the WGBH capacity and the UMass uplink, along with limited use of excess capacity on the SportsChannel and ITFS channels, will enable MCET to begin providing video capacity. The MCET staff is already lining up pilot projects for the use of these facilities, along with short term experimental use of vacant capacity on the SportsChannel (a pay TV service). Among the projects being developed are:

The distribution of a lecture originating at the Harvard Kennedy School to an audience in Springfield;

The live transmission of a Ford Hall Forum program on world hunger to the 8-College Consortium in Springfield;

The transmission (via SportsChannel) of a medical teleconference originating at Beth Israel Hospital to community hospitals in Beverly, Brockton, Springfield and Fitchburg; and

A project involving the Mass. Department of Education; etc.

Mr. Borten asserted that while the WGBH relay systems, even supplemented with capacity on the SportsChannel and a satellite uplink at Umass/Amherst, gives us an important opportunity to experiment with video uses, they can essentially provide only a link between Boston and Springfield. Borten said such capacity cannot provide a fair test of whether there is a market for a statewide voice, data and video educational telecommunications network.

Borten said, "We don't need an extensive test to know that Massachusetts institutions want to reach beyond Boston and the Pioneer Valley. No one contends that a genuine statewide network can be achieved with existing capacities; such a network is going to require a new multi-channel transmitting and receiving capability that can reach all parts of the state. And noting that 40 Massachusetts hospitals have purchased satellite receiving dishes in the past six weeks, I believe institutions are willing to invest in telecommunications and begin using new technologies."

Mr. Borten stressed, however, that MCET has before it an opportunity to obtain funding for the development of the kind of statewide network envisioned by the State Legislature. He noted that the Washington-based federal development firm of Cassidy & Associates (which has successfully captured federal funds for UMass' Polymer Center, for Tufts' Nutrition Center and Medical Library, for Boston University's Science and Engineering Center and numerous other projects) believes the time is right to pursue federal funds for the development of educational telecommunications systems. Borten said he shares Cassidy & Associates' view that if Massachusetts does not pursue these funds they will simply go to other states.

He informed the Board that the Executive Committee of Boston University's Board of Trustees has authorized a $1,250,000 grant from Boston University to MCET for the purpose of retaining Cassidy & Associates for a 30-month period to obtain federal support for network development. Cassidy & Associates' responsibility would be to seek to obtain $10 million for the development of a state-of-the-art telecommunications network to be owned and operated by MCET and to serve the institutions and sectors identified in MCET's enabling legislation. The firm would also be instructed to seek additional funds for the development of telecommunications and data resource centers at Boston University and UMass/Amherst to be located at and operated by those institutions respectively and tied into the MCET network.

Report of the Executive Director (cont'd)

Dr. Knapp moved and Dr. Daube seconded the following resolutions based on the the recommendations of the Executive Director:

R E S O L U T I O N "A"

MOVED: In accordance with section 4(k) of Chapter 560 of the Acts of 1982 to establish a trust fund to be known as the MCET Development Trust Fund; provided that the purpose of this Trust Fund is to receive and accept gifts, grants and other funding sources and to expend therefrom monies for expenses incurred in connection with the development and/or operation of a state-wide telecommunications network to meet the educational and informational needs of business, industry, government and the inhabitants of the Commonwealth.

R E S O L U T I O N "B"

MOVED: In accordance with section 4(k) of Chapter 560 of the Acts of 1982, to accept a donation of One Million Two Hundred and Fifty Thousand Dollars ($1,250,000) from Boston University by vote of the Executive Committee of its Board of Trustees dated September 10, 1985; provided, however, that these funds shall be expended in accordance the terms and conditions governing their use as stipulated by the Executive Committee of the Board of Trustees of Boston University and further in accordance with applicable provisions of the Declaration of Trust for the trust fund entitled MCET Development Trust Fund, said trust fund established by vote of the MCET Board of Directors on September 23, 1985.

R E S O L U T I O N "C"

MOVED: In accordance with sections three and four of Chapter 560 of the Acts of 1982 to authorize the Executive Director to negotiate and execute a consultant agreement with Cassidy & Associates for strategic planning and development services including preparation of federal, state and private grant applications, subventions and subcontracts for a period not to exceed thirty months and an amount not to exceed $1,250,000.

R E S O L U T I O N "D"

MOVED: In accordance with Sections 3 and 4 of Chapter 560 of the Acts of 1982 to authorize the Executive Director to negotiate and execute an agreement among MCET, Scientific-Atlanta Company, the University of Massachusetts at Amherst and any other educational institutions for the joint acquisition of a steerable C-Band satellite uplink to be located on the campus at the University of Massachusetts at Amherst and accessible to MCET for the benefit of its clients.

Judge Tamburello asked about the role of Cassidy and Associates and the reason for Boston University's grant. Dr. Sibler explained that the Boston University Trustees voted to donate the funds to MCET when it became clear that the optimal means for funding development of an MCET network was through the federal budgetary process. According to Dr. Silber, the firm of Cassidy and Associates, Inc. was selected because of its excellent track record in obtaining federal funds for educational institutions.

Megan Jones asked about the proposed data resource centers to be located at Boston University and the University of Massachusetts. Mr. Borten explained that while the concept of the centers is still in a formative stage, MCET's studies indicate a need for networks like that envisioned by Chapter 560 to be tied to major data resource centers.

Mr. Snyder noted that the availability of resources at Boston University and UMass will be valuable to the smaller institutions in the state. He asked about the terms governing Boston University's grant to MCET. Dr. Silber said that the only condition is that the money be spent on development of federal support for the creation of a telecommunications network and the data centers.

Mr. Snyder also asked if the state administration has expressed a position on the grant. Chairman Duff said that he had spoken with the Secretary of Administration and Finance who is supportive. Mr. Borten stated that a representative of Cassidy & Associates had met with the Governor's Education Advisor, Gerard Indelicato, who also voiced strong support for the project. It was further noted that MCET, as an independent corporate body does not legally require Administration approval of this action. (Letters from US Representatives Edward Markey and J. Joseph Moakley, and from Cullinet Software Corporation president John Cullinane urging MCET approval of the grant were distributed to members.)

Dr. Knapp introduced William Cloherty of Cassidy and Associates. In response to a question from Henry Becton, Mr. Cloherty observed that Congress is currently disposed towards funding high-tech related areas because of the current economic downturn in that industry and is increasingly sensitive to the need to invest in the future, i.e., our children. He noted that other states are moving to capture funds, so now is the time to move.

Judge Tamburello asked if the 30-month timetable for completion of the contract was adequate; Mr. Cloherty replied that in his and Mr. Cassidy's opinion, it was. Mr. Becton asked if the proposed satellite uplink would be owned jointly by MCET and the University of Massachusetts. Mr. Borten stated that the uplink would be owned by the University, MCET, and possibly other institutions.

The Board voted on the Resolutions as submitted. Resolutions A, B and C were approved unanimously with Dr. Silber abstaining. Resolution D was unanimously approved with Dr. Silber and Dr. Knapp abstaining.

On the motion of Mr. Becton, seconded by Mr. Snyder, the Board voted unanimously to express its gratitude to Boston University for its generous donation to MCET.

Next, the Executive Director informed the Board of his intention to renew contracts with the law firm of Foley, Hoag & Eliot; the economic consulting firm, Economics and Technology, Inc.; and the accounting firm, KMG Main Hurdman. When the contracts have been executed, the Executive Director will return to the Board for ratification.

Upon the motion of President Knapp, the meeting was adjourned at approximately 10:50 a.m.

The next meeting of the Board of Directors will be on Monday, December 16, 1985.

THE COMMONWEALTH OF MASSACHUSETTS

CORPORATION FOR EDUCATIONAL TELECOMMUNICATIONS

McCormack Building / One Ashburton Place / Boston, MA 02108 / (617) 727-6286

BOARD OF DIRECTORS

Meeting of December 16, 1985

MINUTES

The eighteenth meeting of the Board of Directors of the Massachusetts Corporation for Educational Telecommunications was held on Monday, December 16, 1985 at the offices of Board member Richard Snyder, Esq., 265 Franklin Street, Boston, Massachusetts. The meeting was called to order at approximately 10:15 a.m.

In attendance were Board members Chairman John B. Duff, William Cantor, Sr. Mary Dooley, Helen A. Donohue, President David Knapp, Commissioner John Lawson, President Vincent Mara, Richard Snyder and Judge Paul Tamburello. Also in attendance were Executive Director Richard A. Borten, Treasurer Charles Smith, Secretary James E. Samels, Jonathan Westling, Russel Jones, Richard Connell, Claire Van Ummerson, Joyce Kirby, Kevin Crain, John LeBaron, Ruth Ferguson, Abbie Goodman, Martin Kessel, Ruth Ballinger and Linda DiRocco.

Upon motion made by President Mara, the minutes of the September 23, 1985 meeting were unanimously accepted as submitted.

Chairman's Report

Chairman Duff reported that Senate bill 1501, adding the Secretary of Administration and Finance to the MCET Board of Directors, was reported out of the Senate Ways and Means Committee and engrossed in the Senate on Monday December 9, 1985. The bill is currently in the House Ways and Means Committee. The Chairman also informed the Board that MCET has refiled that legislation for the 1986 session, anticipating the possibility that the bill may not reach final enactment in 1985.

The Chairman told the Board that the Budget Bureau has notified MCET that the Governor's recommended funding level for Fiscal Year 1987 will be $677,000.

Chairman Duff reported to the Board on a December 13th meeting he and the Executive Director had with Secretary Keefe regarding release of the $300,000 in Fiscal Year 1985 appropriations currently being withheld by A&F. While the Secretary has not yet agreed to release the funds, he has taken under advisement MCET's request.

Dr. Duff announced the resignation of Father Monan from the MCET Board of Directors. The Chairman and the Executive Director also discussed the status of the membership of the Board as of January 1986, noting that as many as ten members will have vacated their positions or be holdovers. Because of the uncertainty of the composition of the Board, the Chairman recommended that Vice Chairman Knapp in his capacity as interim Chairman appoint a Nominating Committee that should meet and report to the Board regarding a slate of officers at the March 1986 Annual Meeting.

Mr. Borten noted that, according to the records of the Secretary of State, the terms of Dr. Daube and Sister Mary Dooley expired in January 1985, and the terms of Mr. Cantor and Mayor Neal will expire in January 1986. The position reserved for the Superintendent of a Massachusetts public K-12 school system has been vacant since Dr. Spillane's departure from Boston. Mr. Kinnaly has informed the staff of his intention to resign from the Board.

Chairman Duff then expressed his sentiments about serving as the first Chairman of the MCET Board of Directors and bid farewell to the members.

Executive Director's Report

Executive Director Borten reported further on the meeting he and Chairman Duff had with Secretary Keefe, and on MCET's proposal for expenditure of the $300,000 currently withheld from MCET's FY 86 appropriation.

The Executive Director noted that MCET has implemented two projects aimed at testing cross-state video transmissions. On October 17, MCET transmitted a live Kennedy School Forum featuring author Anthony Lucas and a panel discussion of his book, Common Ground. Using WGBH Intercity Relay capacity and the WGBY studios in Springfield, a group of educators and college administrators were able to view the Forum and ask questions via an audio return over telephone lines. The total cost for use of NET cables from Harvard to WGBH and use of the studio at WGBY came to approximately $1500. The Executive Director thanked WGBH for the free use of the Intercity Relay System, and Ruth Ballinger of the MCET staff for coordinating the project.

On October 20, MCET transmitted live a Ford Hall Forum on World Hunger featuring Frances Moore Lappe, author of Diet for a Small Planet, and Deborah Toler of Oxfam America. The program was transmitted from Northeastern University to Continental Cablevision's studios in Springfield and to Springfield College. Participants from the Cooperating Colleges of Greater Springfield and home cable viewers in Springfield and Longmeadow were able to call in

questions. The Boston Community Access Foundation provided production; Northeastern University carried the signal to WGBH via its ITFS system. At WGBH the signal was inserted into the House of Representatives Intercity Relay System. The signal was sent to the Continental Cablevision system in Springfield which carried the program free on its subscriber and institutional networks. The total project cost was approximately $550, of which STCC and Holyoke Community College each contributed $100. Mr. Borten thanked WGBH for the free use of the House Relay, Northeastern for the free use of the ITFS system, Continental Cablevision for the free use of studios and cable channels, Mayor Neal's office for its efforts in implementing the project, and Abbie Goodman of the MCET staff for coordinating the project.

The Executive Director next reported on the progress of the federal development project. Cassidy and Associates and MCET are developing a detailed strategy for pursuing federal funds. MCET is developing a document to be marketed on Capitol Hill that will describe a statewide telecommunications system. The overall theme is that the system should address the needs of primary, secondary and higher education and serve as a vehicle to keep the state's industrial base at the technical leading edge and highly competitive. MCET's position is that through the sharing of resources via telecommunications, our schools can have more effective teachers and teaching programs, that the Commonwealth's most marketable resources are information resources and that telecommunications provides a means of enhancing and exporting those resources.

The Executive Director proposed Board approval of the following consultant contracts for FY 86:

On the motion of President Mara, seconded by President Knapp, the following resolution was unanimously approved:

MOVED:

> In accordance with sections 3 and 4 of Chapter 560 of the Acts of 1982, to authorize the Executive Director to execute on behalf of the Massachusetts Corporation for Educational Telecommunications a consultant contract with Foley, Hoag & Eliot for the provision of legal services relating to telecommunications issues during the period July 1, 1985 to June 30, 1986, provided, however, that such contract shall be made subject to the availability of funding and in an amount not to exceed $15,000.

On the motion of President Knapp seconded by President Mara, the following resolution was unanimously approved:

MOVED:

> In accordance with sections 3 and 4 of Chapter 560 of the Acts of 1982, to authorize the Executive Director to execute on behalf of the Massachusetts Corporation for Educational Telecommunications a consultant contract with Economics and Technology, Inc., for the provision of technical consultant services concerning economic and regulatory issues in telecommunications during the period July 1, 1985 to June 30, 1986, provided, however, that such contract shall be made subject ot the availability of funding and in an amount not to exceed $25,000.

On the motion of Attorney Helen A. Donohue, seconded by Judge Tamburello, the following motion was unanimously approved:

MOVED:

> In accordance with sections 3 and 4 of Chapter 560 of the Acts of 1982, to authorize the Executive Director to execute on behalf of the Massachusetts Corporation for Educational Telecommunications a consultant contract with Linda DiRocco for the provision of technical services in connection with institutional telecommunications projects during the period December 16, 1985 to June 30, 1986, provided, however, that such contract shall be made subject to the availability of funding and in an amount not to exceed $12,500.

Following the Executive Director's report, there was some discussion of the October video transmissions, as well as the potential for distribution of similar video programming in the future.

The Executive Director then presented plaques expressing appreciation to Commissioner Lawson, who is leaving the Board to join the faculty of the University of New Hampshire, and to Chairman Duff who will be leaving the Board to become the Commissioner of the City of Chicago's library system.

Upon the motion of Commissioner Lawson, seconded by Mr. Snyder, it was unanimously voted to adjourn. The meeting adjourned at approximately 11:00 a.m.

The next meeting will constitute the Annual Meeting and will be held on Tuesday, March 18, 1986.

THE COMMONWEALTH OF MASSACHUSETTS

CORPORATION FOR EDUCATIONAL TELECOMMUNICATIONS

McCormack Building / One Ashburton Place / Boston, MA 02108 / (617) 727-6286

M I N U T E S

Annual Meeting of the Board of Directors

Massachusetts Corporation for Educational Telecommunications

Tuesday, March 18, 1986

The nineteenth meeting of the MCET Board of Directors (constituting the Annual Meeting) was called to order by Acting Chairman Dr. David C. Knapp at 10 a.m. on Tuesday, March 18, 1986 at 250 Stuart Street, Boston.

Present were: Dr. Knapp; Secretary Joseph Alviani; Mr. Henry Becton, Jr.; Helen Donohue, Esq.; Dr. John Silber; Richard Snyder, Esq.; Executive Director Richard Borten and Secretary James Samels, Esq.

Also present were Dr. Russel Jones of Boston University, Megan Jones of the Executive Office of Economic Affairs, Attorney Joyce Kirby of the Board of Regents, David Bernstein of the Office of Management Information Systems, Kevin Crain of the University of Massachusetts, Lee DeNike of Fitchburg State College, Ruth Ferguson and Abbie Goodman of the MCET staff.

The Minutes of the eighteenth meeting of the Board of Directors (December 16, 1985) were approved as written.

Chairman Knapp introduced Joseph Alviani, Secretary of Economic Affairs, who joins the MCET board as an ex officio member in place of Evelyn Murphy. Chairman Knapp noted that Harold Raynolds, Jr., newly designated Commissioner of Education, will be joining the Board in June as an ex officio member serving in place of John Lawson; and that Joseph Finnegan is now an ex officio member in his capacity as Interim Chancellor of the Board of Regents (in place of Dr. John Duff).

Dr. Knapp noted that two of the three positions reserved for presidents of private institutions of higher learning are vacant (those formerly filled by Fr. Monan and Sr. Mary Dooley), along with the position reserved for a School Superintendent and the position formerly filled by John F. Kinnaly.

Chairman Knapp reported that MCET's 1985 legislative proposal to add the Secretary of Administration and Finance to the MCET Board died in the House Ways & Means Committee. MCET has re-filed the legislation for 1986. Dr. Knapp noted that other entities have filed legislation which would add teachers, principals, library representatives and others to the Board.

The Chairman expressed his view that after two years of Board operation, it is time to re-examine the enabling legislation, and in particular the sections governing the composition of the Board. Dr. Knapp asked the new Executive Committee to undertake such a re-examination. Mr. Borten expressed his hope that more business representatives might be added to the Board.

Dr. Knapp reported that Administration and Finance Secretary Frank Keefe approved release of only $30,500 of the $300,000 added to MCET's FY 1986 budget by the Legislature. The staff has initiated further discussions with Sec. Keefe's office for an increase in the amount released; if the results are unsatisfactory, Mr. Borten, Atty. Samels and Chairman Knapp will seek to meet with Sec. Keefe. Sec. Alviani, noting that the implementation of the proposed pilot projects is compatible with the Administration's economic development goals, also volunteered to discuss release of the funds with Mr. Keefe. The money is to be used for the implementation of telecommunications pilot projects utilizing existing telecommunications capacity with the purpose of testing the market for the distribution of educational services via telecommunications, the cost of such distribution, and the success of educational service delivery via telecommunications.

On the motion of Dr. Silber, seconded by Secretary Alviani, the following resolution was unanimously approved:

MOVED:

> In accordance with Sections 3 and 4 of Ch. 560 of the Acts of 1982 to authorize the Executive Director to execute on behalf of MCET a consultant contract with the Price Waterhouse Company for the services of Lisa Savereid for the purpose of providing assistance in the writing and analysis of the federal funding plan during the period March 18, 1986 through June 30, 1986 provided, however, that such contract shall be made subject to the availability of funding and in an amount not to exceed $7,500. (Ms. Savereid is a former member of the US Senate Nutrition Committee staff and former Deputy Director of the City of Boston Office of Policy Management.)

On the motion of Mr. Becton, duly seconded, the following resolution was unanimously approved:

MOVED:

> In accordance with Sections 3 and 4 of Ch. 560 of the Acts of 1982 to authorize the Executive Director to execute on behalf of MCET a consultant contract with Chester Lynn Wickwire for assistance in system development and cable related issues during the period March 18, 1986 through June 30, 1986 provided, however, that such contract shall be made subject to the availability of funding and in an amount not to exceed $11,000. (Mr. Wickwire is former vice president of the Times-Mirror Cable Television Company and former director of the New York State Cable Television Commission.)

On the motion of Secretary Alviani, seconded by Attorney Snyder, the following resolution was unanimously approved:

MOVED:

> In accordance with Sections 3 and 4 of Ch. 560 of the Acts of 1982 to authorize the Executive Director to execute on behalf of MCET a consultant contract with Hickory Mountain Associates for the provision of technical design and engineering services for the federal funding plan during the period March 18, 1986 through June 30, 1986 provided, however, that such contract shall be made subject to the availability of funding and in an amount not to exceed $10,000.

Mr. Borten reported that MCET and WGBH have agreed on a plan for MCET's use of the House/WGBH Inter-city Relay System. This plan calls for payment of $16,500 for 165 hours of transmission time over a one year period. On the motion of Mr. Snyder, with Secretary Alviani seconding, the board approved the following resolution:

MOVED:

> In accordance with sections 3 and 4 of Chapter 560 of the Acts of 1982 to authorize the Executive Director to enter into an agreement with the WGBH Educational Foundation for a one year period providing use of 165 transmission hours at a total cost of $16,500.

The motion was approved with Dr. Silber and Mr. Becton abstaining (the chairman, as is customery, did not vote).

Mr. Borten reported that Rainbow Programming Services (SportsChannel) has offered MCET capacity according to the following schedule of rates and has offered MCET a role as the broker for use of this capacity by non-profit entities:

- Use of distribution system to cable headends: $125/hr
- Use of Boston-to-Amherst trunk capacity: $75/hr
- Use of Satellite Uplink/Transponder & Signal to NY: $450/hr

Mr. Borten requested the Board's approval to purchase up to $5,000 worth of transmission time from Rainbow Programming Services/ SportsChannel during the remainder of the fiscal year. On the motion of Atty. Snyder, seconded by Mr. Becton, the following resolution was unanimously approved:

MOVED:

> In accordance with Sections 3 and 4 of Ch. 560 of the Acts of 1982, to authorize the Executive Director on behalf of MCET to enter into an agreement with Rainbow Programming Services to purchase transmission time as needed in accordance with the terms set forth above. Said agreement will be for the period from March 18, 1986 to June 30, 1986, in an amount not to exceed $5,000.

On the motion of Attorney Donohue, seconded by Attorney Snyder, the following resolution was unanimously approved:

MOVED:

> In accordance with Sections 3 and 4 of Ch. 560 of the Acts of 1982 to authorize the Executive Director on behalf of MCET to enter into lease agreements with best priced vendors for the use of microwave and any other equipment necessary for utilization of existing telecommunications capacities, including data encoding equipment during the period March 18, 1986 through June 30, 1986 provided, however, that said leases shall be made subject to the availability of funding and shall not exceed $20,000 in the aggregate.

The Executive Director requested the Board's approval for transferring MCET's operating funds from a non-interest bearing account to a "NOW" account. On the motion of Mr. Snyder, duly seconded, the following resolution was unanimously approved:

MOVED:

> That the Treasurer of the Massachusetts Corporation for Educational Telecommunications be authorized to terminate the Corporation checking account number 4427 760 6 to move all funds therein at the time of said termination into a Negotiable Order of Withdrawal (NOW) account from which day-to-day operational expenses of the Corporation be paid; and provided further

That State Street Bank and Trust Company, Boston, Massachusetts (herinafter called the Bank), its successors or assigns, be and hereby is designated a despository of this Corporation, and is authorized and directed to pay and to charge to the account of this Corporation without limit as to amount and without inquiry as to circumstances of issue or disposition of the proceeds, even if drawn or endorsed by any signing or endorsing officer or other officer of the Corporation or tendered in payment of the individual obligation of any such officer for his credit or for deposit to his personal account, any and all checks, drafts, notes, bills of exchange, acceptances, other orders for the payment of money upon the Bank, its successors or assigns, or payable at the office thereof and signed on behalf of this Corporation by any of its following officers to wit:

Chairman
Treasurer
Executive Director
Other Authorized Signatories

That the Secretary of the Massachusetts Corporation for Educational Telecommunications be and hereby is authorized to certify to State Street Bank and Trust Company, its successors or assigns, that these resolutions have been duly adopted and that they are in conformity with the enabling legislation and By-Laws of this Corporation and shall remain in full force and effect until notice in writing of revocatiobn or modification signed by the Secretary of the Corporation be delivered to said bank.

In addition to Chairman Knapp, Mr. Borten and Treasurer Smith, the Board voted to designate Secretary Alviani and Mr. Richard Connell (Assistant to Treasurer Smith) as authorized signatories.

Mr. Borten reported that the Internal Revenue Service has not yet issued a ruling on MCET's tax exempt status. Mr. Borten said that in December 1983, he instructed KMG Main Hurdman, MCET's accountants, to prepare a request to the U.S. Internal Revenue Service for a "letter ruling" that MCET is a public instrumentality and as such is exempt from corporate and social security taxes. Main Hurdman had recently obtained such a ruling for the Massachusetts High Technology Park Corporation, which is organized under legislation very similar to Chapter 560 of the Acts of 1982. In March the IRS declined making such a ruling and a new request, drafted with considerable participation by Attorney Samels, has been filed. Mr. Borten stated that should the IRS refuse to rule on the latest request, changes in the MCET By-Laws and/or enabling legislation may be required.

The Executive Director informed the Board that MCET's Directors & Officers Liability Insurance has been cancelled and more than eight applications for a new policy have been rejected. Mr. Borten noted that this is a problem facing most corporations. One company has offered $1 million of coverage for Board members only at an annual cost equal to the amount MCET has paid until now for $10 million of coverage for each officer, director and staff member. Mr. Borten recommended that this offer not be accepted. He stated that MCET's insurance agents have been instructed to continue to seek acceptable coverage.

The Executive Director briefed the Board on the development of a plan for federal funding of a statewide network and two Technology Resource Centers. A draft plan is due next week and will be distributed to Board members. Cassidy & Associates anticipates marketing the plan on Capitol Hill beginning in April.

Noting the pilot projects successfully completed by MCET to date, the Executive Director sought the Board's authorization to proceed with the implementation of additional pilot projects in FY 1986. On the motion of Secretary Alviani, seconded by Attorney Donohue, the following resolution was unanimously approved:

MOVED:

> In accordance with Sections 3 and 4 of Ch. 560 of the Acts of 1982 to authorize the Executive Director on behalf of MCET to implement pilot projects that demonstrate the potential uses and costs associated with educational telecommunications services provided, however, that expenses incurred for the period March 18, 1986 to June 30, 1986 for pilot project development and implementation shall not exceed $30,500.

On the motion of Mr. Snyder, seconded by Mr. Becton, the following resolution was unanimously approved.

MOVED:

> In accordance with Sections 3 and 4(m) of Ch. 560 of the Acts of 1982 to authorize the Treasurer of MCET as the chief financial and accounting officer of the Corporation in charge of the Corporation's funds, books of account and accounting records to invest any funds held in reserves or sinking funds, or any funds not required for immediate disbursement in such investments as may be lawful for fiduciaries in the Commonwealth as he may determine to be in the best interests of the Corporation.

Dr. Knapp noted that, subsequent to the last meeting, he had appointed a Nominating Committee comprised of Dr. Silber, Secretary Alviani and Dr. Daube and charged with proposing a slate of candidates to serve as officers of the Corporation.

The Board unanimously approved the Nominating Committee's recommendations that the following members be elected:

Chairman - Dr. David C. Knapp

Vice Chairman- Mr. Richard J. Snyder, Esq.

Executive Committee (in addition to the Chairman and Vice Chairman)

- Secretary Joseph D. Alviani

- Helen A. Donohue, Esq.

- Dr. John R. Silber

The Board approved the Chairman's recommendation that the following persons also be appointed as officers of the Corporation:

Treasurer - Charles W. Smith

Secretary - James E. Samels, Esq.

The meeting was adjourned at 10:50 a.m.

The next meeting of the MCET Board of Directors will be held Monday, June 16, 1986.

APPROVED AS AMENDED - 9/15/86

Amended

M I N U T E S

MASSACHUSETTS CORPORATION FOR EDUCATIONAL TELECOMMUNICATIONS

Meeting of the Board of Directors

Monday, June 16, 1986

The twentieth meeting of the MCET Board of Directors was called to order by Chairman David Knapp at 10:05 a.m. on Monday, June 16, 1986 at One Ashburton Place, Boston.

Present were: Dr. Knapp; Vice Chairman Richard Snyder, Esq.; Secretary Joseph Alviani; President David M. Bartley; William Cantor; Helen Donohue, Esq.; Interim Chancellor Joseph Finnegan; Superintendent Lincoln Lynch; Judge Paul Tamburello; Charles Tretter, Esq.; Executive Director Richard Borten; and MCET Secretary James Samels, Esq.

Also present were: William Cloherty and Vincent Versage of Cassidy and Associates; Dr. Russel Jones and Richard Connell of Boston University; Megan Jones of the Executive Office of Economic Affairs; James Corum of OMIS; John LeBaron of the Bureau of Educational Resources; Joyce Kirby, Esq. of the Board of Regents; and Deputy Director Ruth Ferguson, Abbie Goodman, Linda DiRocco and Martin Kessel of the MCET staff.

The minutes of the nineteenth meeting of the Board of Directors (March 18, 1986) were approved as submitted.

Chairman Knapp introduced and welcomed the new members of the Board: Dr. Lincoln Lynch, Superintendent of the Middleborough schools, and Charles C. Tretter, General Counsel to the New England Governor's Conference. The other new Board member, Dr. Harold Raynolds, Jr. Commissioner of Education, was unable to attend.

Dr. Knapp reported that Senate Bill 272, which would add the Secretary of Administration and Finance to the MCET Board, is currently in the Senate Ways and Means Committee. The Chairman also informed the Board that the Fiscal Year 1987 budget recommendation of $677,000 has not been changed by the House or the Senate.

The Chairman reported on meetings held in Washington, D.C. with members of the Massachusetts Congressional delegation on April 30. Chairman Knapp, Vice Chairman Snyder, Dr. Silber, UMass/Amherst Chancellor Joseph Duffey, and Executive Director Borten met with

Senator Kennedy and Congressmen Atkins, Markey, Moakley and Conte. All of the meetings were successful, with each legislator expressing support for the MCET proposal for federal funding of a statewide telecommunications network.

At the request of the Chairman, Attorney Samels, Secretary to the Corporation, gave a report concerning several curative amendments to the Corporation's enabling legislation (Chapter 560 of the Acts of 1982) which the Board had previously discussed. Mr. Samels indicated that the Board may consider the following possible amendments:

1. An amendment adding language clarifying MCET's non-profit tax status;

2. An amendment increasing the size of the Board to include an appropriate level of telecommunications business and industry representatives. In this latter regard, it was noted that too large a board may be unwieldy or cause an increase in the Board's existing quorum requirements.

3. An amendment to correct the drafting error currently in the enabling legislation pertaining to the misplacement of the section requiring plan approval.

Chairman Knapp asked that the Executive Committee consider the items mentioned by Mr. Samels and determine whether to seek any other curative legislation and if so, the form and content of such proposed legislation.

On the motion of President Bartley, seconded by Atty. Snyder, all actions and votes taken at the Annual Meeting of the MCET Board of Directors on March 18, 1986 were ratified.

The Executive Director briefed the Board on the major activities of the Corporation since the Annual Meeting. Most of the staff's time had been spent on two activities, completion of the federal funding proposal and implementation of pilot projects. The federal proposal, which had been distributed to all Board members prior to the meeting, was summarized by Mr. Borten. There followed a lengthy discussion of issues relating to the application of telecommunications technologies in education.

Next Mr. Borten discussed two recently implemented pilot projects:

-- A teleconference regarding the use of instructional software in public schools, produced by the Bureau of Educational Resources of the Department of Education; and

-- A teleconference concerning adult literacy training sponsored by the Board of Library Commissioners.

The Corporation will also be implementing an audioconference for the Commission on the Blind on June 25, 1986. Mr. Borten expressed particular appreciation of the efforts of Abbie Goodman, Institutional Projects Manager, and Linda DiRocco, Project Development Director, in making these first projects successful.

The Executive Director then proposed that the Corporation continue its pilot project program into the coming fiscal year. Upon the motion of President Bartley, seconded by Mr. Snyder, with Superintendent Lynch abstaining, the following resolution was unanimously voted:

MOVED: In accordance with sections three and four of Chapter 560 of the Acts of 1982, to authorize the Executive Director on behalf of the Massachusetts Corporation for Educational Telecommunications to continue the implementation of pilot projects that demonstrate the potential uses and costs associated with educational telecommunications services, provided that such projects are subject to availability of funding, and that expenses incurred for the period July 1, 1986 through June 30, 1987 for pilot project implementation shall not exceed $174,000.

Mr. Borten informed the Board of his intention to retain consultants for the Fiscal Year 1987. Accordingly, the Board authorized the following contracts:

Upon the motion of President Bartley, seconded by Atty. Tretter, it was unanimously voted, with Superintendent Lynch abstaining,

MOVED: In accordance with sections 3 and 4 of Chapter 560 of the Acts of 1982, to authorize the Executive Director on behalf of the Massachusetts Corporation for Educational Telecommunications to execute a consultant contract with Economics and Technology, Incorporated, for the purpose of providing analysis on economic and regulatory issues relating to the role of the Corporation during the period July 1, 1986 through June 30, 1987, provided, however that such contract shall be made subject to the availability of funding and in an amount not to exceed $25,000.

Upon the motion of President Bartley, seconded by Atty. Tretter, it was unanimously voted, with Interim Chancellor Finnegan and Superintendent Lynch abstaining,

MOVED: In accordance with sections 3 and 4 of Chapter 560 of the Acts of 1982, to authorize the Executive Director on behalf of the Massachusetts Corporation for Educational Telecommunications to execute a consultant contract with the General Counsel's Office of the Board of Regents of Higher Education for the purpose of providing legal services to the Corporation at the direction of the Executive Director during the period July 1, 1986 through June 30, 1987, provided, however that such contract shall be made subject to the availability of funding and in an amount not to exceed $9,000.

Upon the motion of Secretary Alviani, seconded by President Bartley, it was unanimously voted, with Superintendent Lynch abstaining,

MOVED: In accordance with sections 3 and 4 of Chapter 560 of the Acts of 1982, to authorize the Executive Director on behalf of the Massachusetts Corporation for Educational Telecommunications to execute a consultant contract with Charles J. Beard, Esq. of Foley, Hoag and Eliot, for the purpose of providing legal and financial analysis on matters relating to the telecommunications industry during the period July 1, 1986 through June 30, 1987, provided, however, that such contract shall be made subject to the availability of funding and in an amount not to exceed $10,000.

Upon the motion of President Bartley, seconded by Mr. Snyder it was unanimously voted, with Superintendent Lynch abstaining,

MOVED: In accordance with sections 3 and 4 of Chapter 560 of the Acts of 1982, to authorize the Executive Director on behalf of the Massachusetts Corporation for Educational Telecommunications to execute a consultant contract with McKenna, Wilkinson and Kittner, for the purpose of providing advice and legal counsel in specialized telecommunications matters pending before the Federal Communications Commission during the period July 1, 1986 through June 30, 1987, provided, however, that such contract shall be made subject to the availability of funding and in an amount not to exceed $15,000.

Upon the motion of Atty Snyder, seconded by President Bartley it was unanimously voted, with Superintendent Lynch abstaining,

MOVED: In accordance with sections 3 and 4 of Chapter 560 of the Acts of 1982, to authorize the Executive Director on behalf of the Massachusetts Corporation for Educational

Telecommunications to execute a consultant contract with C. Lynn Wickwire, for the purpose of providing advice and assistance in pilot project implementaion and network development during the period July 1, 1986 through June 30, 1987 provided, however, that such contract shall be made subject to availability of funding and in an amount not to exceed $8,000.

Upon the motion of President Bartley, seconded by Atty. Snyder it was unanimously voted, with Superintendent Lynch abstaining,

MOVED: In accordance with sections 3 and 4 of Chapter 560 of the Acts of 1982, to authorize the Executive Director on behalf of the Massachusetts Corporation for Educational Telecommunications to execute a consultant contract with Ruth A. Ballinger for the purpose of providing assistance in ongoing projects of the Corporation during the period of July 1, 1986 through June 30, 1987 provided, however, that such contract shall be made subject to availability of funding and in an amount not to exceed $10,000.

Following some discussion, during which the Executive Director expressed some disappointment with the level of service and responsiveness the Corporation has received from its public accounting firm (particularly regarding efforts to obtain an IRS Ruling on our tax exempt status), the Board unanimously approved, with Superintendent Lynch abstaining, the motion of President Bartley that

MOVED: In accordance with sections 3 and 4 of Chapter 560 of the Acts of 1982, to authorize the Executive Director on behalf of the Massachusetts Corporation for Educational Telecommunications to execute a consultant contract with KMG Main Hurdman, for the purpose of providing auditing and accounting services for the Corporation during the period July 1, 1986 through June 30, 1987 provided, however, that such contract shall be made subject to the availability of funding and in an amount not to exceed $5,000.

William Cloherty of Cassidy and Associates informed the Board of the progress to date on the efforts to obtain federal funding for a statewide educational telecommunications network for the Commonwealth. Over the past several months, Cassidy and Associates has worked with the MCET staff and others to develop a "prospectus" or marketing document for the concept of federal funding of a regional educational telecommunications demonstration network and university-based technology resource centers.

Cassidy and Associates has brought the MCET regional network concept and proposal to the attention of key members of the Massachusetts and

New England Congressional delegations and enlisted their support for an authorization and future appropriation.

Cassidy and Associates has developed a two-track strategy to pursue an authorization of the regional program this year.

The primary strategy is to authorize the regional network in the Higher Education Act reauthorization bill which will be in conference between the House and Senate in early summer. We have commitments from Senator Kennedy, Congressman Atkins, and Congressman Moakley to pursue that authorization route. There is a good likelihood of success with this strategy.

The secondary strategy, which has already taken a large step forward, is seeking an authorization for the regional network in the Omnibus Trade bill. During House consideration of the Trade measure, Congressman Atkins, with the help of Congressman Moakley, obtained passage of the regional network authorization language. Because the Trade bill is controversial, and opposed by the White House, the likelihood for enactment of the measure is not very high. However, with the U.S. trade situation worsening, and with trade becoming a campaign issue, the possibility of a Trade bill moving cannot be ruled out.

Cassidy and Associates is very optimistic that one of these two strategies will result in the authorization of the regional network and technology resource centers. Once this has occurred, Cassidy and Associates will begin working to obtain appropriations pursuant to the authorization. There is a possibility that some funds may be appropriated for the network this fall, but it is most likely that the main appropriation will be made next year. It is also possible that the appropriations for network and centers will be made over two or three years.

Mr. Borten reported to the Board that late in May the Corporation received a draft contract from WGBH for MCET's use of the WGBH and House of Representatives Intercity Relay Systems. MCET anticipates signing a one-year agreement with WGBH shortly, and has begun to line up projects for use of that capacity. Board members were urged to consider uses of the capacity by their institutions.

Mr. Borten then reported that Martin Kessel and Deputy Director Ruth Ferguson are providing consulting services on behalf of MCET to Southeastern Massachusetts University, with regard to SMU's application for FCC licenses to operate Instructional Television Fixed Service (ITFS) channels at SMU, with a repeater site at Cape Cod Community College. The consulting services are being provided for $7500, an amount reflecting the anticipated cost of staff time and expenses.

The Executive Director reported that MCET's insurance broker has not yet been able to obtain Directors and Officers Liability Insurance coverage, but there remains one application still pending. Megan Jones noted that MIFA and other quasi-publics are having similar difficulty obtaining liability coverage, and are investigating options for self-insurance. The MCET staff was urged to contact MIFA to determine whether MCET could participate in the joint efforts.

Mr. Borten next called upon Atty. Samels to advise the Board on the role the Division of Capitol Planning and Operations (DCPO) and the Designer Selection Board (DSB) will play when MCET obtains federal support for network development as anticipated. Attorney Samels indicated that MCET may be able to obtain a waiver of DSB jurisdiction if it can show that MCET's procedures for bidding and awarding contracts is in substantial accordance with DSB procedures. In addition, he noted that DCPO may be willing to enter into a memorandum of agreement with MCET allowing MCET to proceed without restriction or delay by DCPO if proper bidding procedures are followed. The final outcome of future discussions with DCPO and DSB will be reported to the Board.

Mr. Borten told the Board that, in accordance with the authority granted to the Treasurer at the last meeting, Charles Smith supervised the investment of a portion of the Corporation's funds in thirty to ninety day certificates of deposit at the Boston Five Cents Savings Bank.

Mr. Borten reported on the progress of plans for the Second Annual Gutenberg Conference which MCET is co-sponsoring with Boston University and with financial support from the Boston Globe and Boston World Trade Center. Communications specialists from the US and Germany will be attending, along with such government leaders as the Secretary of State of the Federal Republic of Germany.

Upon the motion of President Bartley, seconded by Atty. Snyder, the Board unanimously voted to ratify and confirm the personnel actions recommended by the Executive Director.

At the suggestion of President Bartley, it was decided that the next Board meeting will be held on Monday, September 15, 1986 at 10:00 a.m. at Holyoke Community College.

The meeting adjourned at approximately 11:30 a.m.

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Annual Report

Fiscal Year 1987

Massachusetts Corporation for Educational Telecommunications

CONTENTS

Fourth Annual Report

Appendices

1. Technical Assistance Program - FY87 Summary of Activities

2. Summary Evaluation of the Technical Assistance Program (Fiscal Year 1987) by the Lincoln Filene Center for Citizenship and Public Affairs at Tufts University

3. S. 778 - The Star Schools Program Assistance Act

4. 1987 Legislation

5. Network Design Work Plan

6. MCET Board of Directors

7. Minutes of the Meeting of the MCET Board of Directors

8. Financial Statements and Accompanying Information, Years Ended June 30, 1987 and 1986, and Report of Certified Public Accountants

FOURTH ANNUAL REPORT

For the Year Ending June 30, 1987

I. Introduction

The Massachusetts Corporation for Educational Telecommunications (MCET) is an independent public corporation of the Commonwealth established by Chapter 560 of the Acts of 1982. MCET's mission is to build and operate a statewide network to serve the educational needs of a wide range of sectors - including schools, public and private higher education, health care and government.

In creating MCET, the Commonwealth recognized that advanced telecommunications technologies could contribute to the state's educational and economic development through resource sharing and electronic delivery of instruction.

In Fiscal Year 1987 MCET focussed on two major program areas:

-- Initiation of the Technical Assistance Program (TAP), using existing capacity to test and demonstrate the use of educational telecommunications for the delivery of educational services by Massachusetts institutions; and

-- Pursuit of federal support for the development of an educational telecommunications network for Massachusetts and the New England region.

Significant progress in both these efforts brought MCET to a new phase in its development.

-- Through the Technical Assistance Program, MCET has helped a large number of institutions begin utilizing telecommunications to achieve educational goals.

-- Congress has responded to MCET's proposal that the federal government play an active role in the development of educational telecommunications, by passage of the "Star Schools" program.

-- Through both the TAP project and the network development efforts, MCET has fostered new cooperative relationships among historically competing universities, between private and public institutions, and between educational institutions and industry.

II. TECHNICAL ASSISTANCE PROGRAM (TAP)

MCET articulated the following goals for the Technical Assistance Program:

- To identify the educational telecommunications market in Massachusetts;
- To determine new capacities and services needed to enable Massachusetts institutions to deliver educational services via telecommunications; and
- To provide institutions with initial experiences in the use of telecommunications.

The TAP program's first year can be described as an unqualified success. Nine Massachusetts institutions and agencies served as sponsors for fourteen television projects reaching fifteen different cities and towns. A year-long data project enabled science teachers throughout the state to confer with their peers and university scientists. An estimated 3,000 people were reached by these transmission events.

In addition, MCET provided advice and consultation to forty institutions and agencies. The TAP program coordinated such diverse telecommunications projects as the Governor's "Teamwork and Innovation" conference, a seminar on the "Right to Know" law, teleconferences on the impact of AIDS in the public schools

and in higher education, and national distribution of a program to improve the skills of middle school math teachers.

The TAP program has introduced many institutions to educational telecommunications and has fostered the sharing of educational and teaching resources among a wide variety of Massachusetts sectors. A number of the institutions that used telecommunications for the first time in FY87 are returning in FY88 to utilize MCET's services without subsidization. Among them, the Boston University Area Health Education Center (AHEC) is expanding its video-based interactive continuing education series from eight sites to twenty, and will pay for the transmission of its series of eighteen programs.

The following chart summaries TAP projects implemented in FY 87. For further information, see Appendix I, TAP-FY87 Summary of Activities.

In its first year the TAP program provided institutions with the following services, enabling them to use telecommunications technology for the delivery of educational programming:

1. Consultation on the design of a telecommunications plan for each project, including budgeting, production planning, and arrangement for the independent evaluation of each project.

DATE	TITLE	SPONSOR	PURPOSE	FORMAT	ORIGINATION POINT	RECEIVE SITES	EXISTING TECHNOLOGY	TEMPORARY LEASED	TOTAL	MCET TOTAL
9-22-86	"Creating the Future: Teamwork & Innovation in the Mass. Economy"	Governor's Ofc of Economic Development	Discuss issues of economic policy w/educators, labor leaders, business reps. and college students	One-way video with audio-conf	UMass at Boston	UMass Amherst, Southeastern Mass. Univ., N. Dartmouth; UMass Med. Ctr. at Worcester	New England Sports Network	6 Ghz microwave (New England Telephone)	(appx) $20,000	$4,272
10-86 / 6-87	Physics Forum	Dept. of Physics & Astronomy, UMass Amherst	Computer bulletin board & message service for high school Physics teachers in Mass.	Voice grade 800 telephone # at UMass	UMass at Amherst	Statewide access	Telephone service		29,500	15,000
11-13-86 12-16-86	Public Policy Forum: "The Right to Know"; "The Changing Nature of Federal Funding"	Inst. for Gov't Srvcs, UMass Amherst	Involve senior level public mgrs & elected officials in discussion & examination of controversial topics	Two-way video	Spfld Tech Comm Coll, Gutman Conf Ctr at Harvard University in Cambridge	Spfld Tech Comm Coll, Gutman Conf Ctr in Camb.	House of Reps. InterCity Relay System (WGBH); Continental Cablevision of Spfd; New England Tel. video link (Harvard - WGBH)		6,011	4,312
									*not including production costs	
2-27-87	HealthNet: "Results in a Landmark Study in Hypertensiveness"	Boston Univ. Area Health Educ. Center	Continuing ed. for health care professionals	One-way video/ audio-conf.	Boston Univ.	North Shore Comm Health Ctr, Peabody; Manet Comm. Health Ctr, Quincy; Watertown Public Library (Watertown Health Ctr); Greater Lwrnce Family Hlth Ctr; Brightwood - Riverview Hlth Ctr, Spfld; Neighborhood Hlth Ctr, Spfld; Wesson Memorial Unit, Spfld Wesson Women's Unit, Spfld.	Boston Univ. ITFS network; Boston Catholic Television, SportsChannel satellite & microwave network; House of Reps. InterCity Relay (WGBH); Continental Cablevision of Spfld; Bay State Med. Ctr Educ. Network; Continental Cablevision of Lwrce; Continental Cablevision of Watertown; Admas-Russell Cablevision, Peabody; American Cablesystems, Quincy	23 Ghz (Boston University)	*$14,190	$8,850
3-13-87	"Rheumatoid Arthritis: When NSAIDs Fail"									
3-27-87	"Rheumatoid Arthritis (cont)"									
4-10-87	"Congestive Heart Failure"									
4-24-87	"Recurrent Peptic Ulcer Disease"									
5-1-87	"Treatment of the Diabetic Foot"									
5-15-87	"Chronic Osteomyolitis"									

DATE	TITLE	SPONSOR	PURPOSE	FORMAT	ORIGINATION POINT	RECEIVE SITES	EXISTING TECHNOLOGY	TEMPORARY LEASED	TOTAL	MCET TOTAL
4-8-87	"Confronting AIDS on the Campus"	Mass. Dept. of Public Health	AIDS info. for college campus Deans of Students & administrators	One-way video, audioconference	Bunker Hill Comm Coll	UMass Boston, Northern Essex Comm Coll, Haverhill; Southeastern Mass. Univ., N. Dartmouth; Wor. Polytechnic Inst.; Western N.E. Coll, Spfld.	SportsChannel satellite network; Greater Wor. Cable	23 Ghz (New England Satellite Systems)	5,220	2,400
4-28-87	"Teaching AIDS in High School"	Mass. Dept. of Public Health	Info for high school teachers, principals & school cmmtts	One-way video, audioconference	Bunker Hill Comm Coll	UMass Boston; Ctr for Field Srvs, Univ of Lowell, Southeastern Mass. Univ, N. Dartmouth; Western NE Coll, Spfld; Berkshire Comm Coll, Pittsfld; Wachusett Comm Coll, Gardner; Wachusett Reg. High School, Holden.	SportsChannel satellite network Colony Comm Lowell	23 Ghz (NE Satellite Systems)	5,993 (estmt)	2,540 (estmt)
5-8-87	"Invisible Experiences"	Deaf Media Coalition; BU Ctr for the Study of Communication & Deafness	To discuss methods of communication used in the educ. of the Deaf for parents of Deaf children, professionals, & members of the Deaf Comm.	One-way video, audioconference (bi-lingual: English, ASL)	Boston Univ.	Bunker Hill Comm Coll, Boston; Southeastern Mass Univ, N. Dartmouth; Northern Essex Comm Coll, Haverhill; South High Comm Schl, Wor.; Spfld Tech Comm Coll	BU ITFS netwrk; Boston Catholic Television; SportsChannel satellite network; House of Reps. InterCity Relay System (WGBH); Continental Cablevision of Spfld; Greater Wor. Cable, Inc.	23 Ghz (BU)	6,350 (estmt)	3,200 (estmt)
5-12-87	"The Regional Math Netwrk"	The Regional Math Network at the Harvard Grad. School of Education	To present a model for a univ run middle school math teacher invigoration prog.	One-way video; 800 no. call in	Bunker Hill Comm College	Nat'l telecon.	SportsChannel satellite network	23 Ghz (NE Satellite Systems)	3,500 (estmt)	1,850 (estmt)

2. Subsidization of transmission costs up to 75%.

3. Brokering telecommunications capacity, production facilities and receive site facilities.

4. Supervision of project implementation.

5. Training of site coordinators through workshops and the development of handbooks specific to each project.

One objective of the TAP is to test the effectiveness of using existing telecommunications capacity for the distribution of programming, since it is MCET's goal to develop a network that provides services not obtainable from existing capacities. MCET negotiated for the use of a wide variety of capacities, and often obtained free use of these transmission and reception facilities. TAP projects utilized existing telecommunications capacity for full-motion video services (one-way and two-way), audioconferencing, and a computer bulletin board/message service.

MCET has concluded from the first year of TAP experience that existing capacity was adequate for a limited number of pilot projects, but that an effective, extensive and affordable statewide or regional network is necessary to provide the larger

scale of telecommunications capabilities that are urgently needed by Massachusetts institutions. In particular, the primary video transmission services available to MCET -- the SportsChannel microwave and satellite network and the WGBH/House of Representatives Intercity Relay Systems -- had a number of serious limitations despite the fact that these systems are perhaps the most flexible and pervasive currently available. Among the limiting factors associated with these services are the fact that they are available for only a limited number of hours, programs can originate only from the Boston and Springfield areas, and use of these systems for educational purposes can be preempted by higher paying customers.

MCET believes that to properly meet the telecommunications needs of institutions, the following are needed:

(1) More affordable access to full-motion video services for institutions that plan to provide information and educational services, particularly those outside the Boston area;

(2) Increased flexibility and capacity for scheduling teleconferences and telecourses;

(3) Improved technical quality of transmission services and receive equipment;

(4) More affordable data communications services, especially for high school teachers;

(5) Highly demanded information about the use of telecommunications and educational technologies;

(6) More information about, and access to, existing educational telecommunications materials and programs; and

(7) Coordination among, and permanent links to, institutions with production and receive site facilities available for public use.

MCET commissioned an independent evaluation of the TAP projects by the Lincoln Filene Center for Citizenship and Public Affairs at Tufts University (see Appendix 2).

II. REGIONAL NETWORK DEVELOPMENT

During Fiscal Year 1986, MCET developed a concept for a regional educational telecommunications network and reviewed this concept with members of the Massachusetts congressional delegation. These meetings led, in FY87, to Senator Edward M. Kennedy's filing of the "Star Schools Program Assistance Act" and the filing of a similar measure in the House of Representatives by Rep. Joseph Moakley.

This bill has been hailed by national educational leaders as among the most important educational initiatives of the 1980's. Key government officials and educators throughout New England have also strongly endorsed the Star Schools bill.

Star Schools would enable the Commonwealth to create a highly advanced, interactive educational network capable of distributing low enrollment, advanced level and other frequently unavailable courses and programming to schools and institutions. The Star Schools bill also calls for the creation of Technology Resource Centers which will help educators and buiness make effective use of telecommunications technology.

In FY86 MCET reviewed with congressional leaders a comprehensive concept for the development of a regional telecommunications network. Congressional response to the concept was extremely positive, leading to the sponsorship of legislation in the House of Representatives and the Senate to fund network development. By the end of the 1986 Congressional session bi-partisan support for network development was evident, and while none of the legislative proposals were successful that year, MCET entered 1987 with a strong sense of optimism.

In January 1987, Senator Kennedy assumed the chairmanship of the Committee on Labor and Human Resources and immediately set educational telecommunications as a priority. On January 14, at a hearing on National Goals in Education, UMass President David Knapp, chairman of the MCET Board of Directors, was invited to testify before the Labor and Human Resources Committee on how telecommunications could help solve some of the nation's

pressing educational problems. Subsequently, the Committee held two hearings devoted solely to the issue of telecommunications in education: on February 27 at Bunker Hill Community College in Charlestown, Massachusetts, and on March 11 in Washington. At both hearings, MCET's network concept was discussed by Dr. Joseph Duffey, chancellor of the University of Massachusetts at Amherst; other speakers included high school students, administrators and teachers, who discussed the need for telecommunications delivery of both high school courses and courses for teachers.

As a result of these hearings, on March 18 Senator Kennedy filed a bill, S. 778, that would fund the development of regional telecommunications networks and stressed the importance of establishing such a network in New England to be developed by MCET. This bill has come to be known as the "Star Schools Program Assistance Act," and was approved by an overwhelmingly favorable vote of the full Senate on April 23 (see Appendix 3).

In the U.S. House of Representatives, Rep. Joseph Moakley of Massachusetts introduced an identical bill to Star Schools, H.R. 2383 on May 12. Earlier, Rep. Moakley introduced an amendment to the Trade and International Policy Reform Act that would provide grant assistance to nine regional advanced educational

telecommunications networks and technology resource centers. This amendment was included in the Trade bill as passed by the House on April 30. The Senate version of the Trade bill, passed in July, included the broader funding proposal from the Star Schools bill. It is expected that the Trade bill conference committee will adopt the broader Senate language.

As currently drafted, Star Schools would provide grants of up to $20,000,000 for the development of regional networks. The bill designation of qualified grant recipients is highly compatible with MCET's organizational status: the bill specifies that eligible grantees include "a public agency or corporation established for the purpose of developing and operating telecommunications networks to enhance educational opportunities." MCET believes it will succeed in securing federal support for network development and anticipates receiving an initial grant of approximately $3,000,000 by June 1988.

IV. OTHER ACTIVITIES

Move

From its inception through March 1987 MCET occupied approximately 700 square feet of space in the McCormack State Office Building. This space quickly became inadequate for the professional performance of MCET's charter. After repeated

unsuccessful attempts to find additional space within the state office building complex, it became clear that there was no alternative but to lease private office facilities. Following an extensive search of available facilities, in the third quarter of FY87 MCET entered into a lease agreement with the World Trade Center of Boston for a three year lease of approximately 3000 square feet of office space at a rent (including basic utilities and maintenance) of $20 per square foot.

State Legislation

MCET filed three legislative bills in 1987 (see Appendix 4):

1. S. 220, a bill to amend Chapter 560 by increasing the membership of the Board of Directors from eighteen to nineteen through the addition of the commissioner of administration. This bill received a favorable report from the Education Committee, and is currently in the Senate Committee on Ways and Means.

2. S.221, which corrects a drafting flaw in MCET's enabling legislation, has been approved by the legislature and signed into law by the governor. This measure, Chapter 110 of the Acts of 1987, became effective September 1, 1987.

3. S. 222, a bill to change the membership and role of the Advisory Council of MCET, has also been approved by the legislature and signed into law as Chapter 111 of the Acts of 1987, effective September 1, 1987.

Creation of Restricted Reserve Fund

Since its creation, MCET's operations have been severely restricted by both the physical constraints of insufficient office space as noted above, and the slower-than-anticipated pace of the process of acquiring funds for network development. Monies appropriated for additional staff and network development activities were, therefore, held in reserve, pending progress in these areas. As of the close of FY87, MCET had accrued a Restricted Reserve Fund of approximately $500,000.

MCET plans to apply the majority of this Restricted Reserve Fund toward meeting the challenges and commitments in the new phase of intense planning and programmatic activities. The Corporation's move in April 1987 to expanded office space enables MCET to bring on urgently needed new support staff to assist in the implementation of these expanded activities. In addition, as Congress moves significantly closer to providing funding for network development, MCET will earmark funds from the Restricted Reserve account to support the Corporation's federal development efforts.

V. PROJECTIONS FOR FY88

Technical Assistance Program

For Fiscal Year 1988 the TAP program has the expanded goal of preparing the Corporation and its market for network operations through:

1. Continuing the involvement of TAP program sponsors in the use of educational telecommunications services.

   MCET plans to accomplish this by:

   a. Conducting a day-long conference in September, 1987 on the mechanics of producing teleconferences and telecourses;

   b. Providing consulting and brokering services for sponsors planning to continue or expand their use of educational telecommunications services; and

   c. Developing and distributing TAP demonstration project outreach materials.

2. Introducing a minimum of 35 additional institutions to the Technical Assistance Program by:

   a. Implementing additional demonstration projects;

   b. Conducting "Telecourse Forum," co-sponsored by the Annenberg/CPB Project to encourage the use of existing telecourse material for higher education; and

c. Planning and implementing a multi-state conference for K-12 educators on the use of educational telecommunications services (scheduled for April 1988).

3. Expanding the Technical Assistance Program to include:
   a. Production consultation services;
   b. A receive site certification process;
   c. Promotion of TAP projects through the media, mailings, MCET newsletter and participation in conferences; and
   d. Development of a consulting service for those institutions and agencies that request assistance in planning for the use of educational telecommuncations technology.

Star Schools

MCET anticipates the successful passage of federal legislation to authorize and appropriate the expenditure of funds for development of a regional telecommunications network for New England. In FY88 MCET hopes to receive an initial grant of approximately $3,000,000.

Technical Design Project

In July 1987 MCET entered into a contract with the CNS

Corporation, to provide technical and engineering assistance in the design and development of a telecommunications network. CNS's project is scheduled to be completed by the end of FY88. A copy of the Work Plan is attached as Appendix 5.

V. Board of Directors

In Fiscal Year 1987 the newly appointed Chancellor of the Board of Regents of Higher Education, Franklyn Jenifer, assumed his ex-officio position on the MCET Board of Directors. (See Board List, Appendix 6 and Minutes of Board Meetings, Appendix 7.)

VI. Audit

Attached as Appendix 8 is a copy of the independent audit conducted for MCET by Peat Marwick Main, Inc.

APPENDICES

1. TAP - FY87 Summary of Activities
2. TAP Evaluation
3. Star Schools bill
4. 1987 Legislation
5. Network Design Work Plan
6. List of Board of Directors
7. Minutes of the FY87 board meetings
8. Audit

APPENDIX 1

TECHNICAL ASSISTANCE PROGRAM

FY 1987 Summary of Activities

Summary of Expenses

FY 1988 Objective and Activities

MCET Technical Assistance Program
Introduction

The MCET Technical Assistance Program was instituted to demonstrate a variety of educational applications of telecommunications technology. Through the program, MCET co-sponsored selected projects by partially subsidizing transmission costs and by providing consulting and brokering services for Massachusetts institutions and agencies.

During the past year, the Technical Assistance Program (TAP) involved nine agencies and institutions in the implementation of fourteen teleconferencing events and a computer bulletin board and message service. (See Appendix I) MCET provided consulting services to an additional 40 Massachusetts institutions and agencies to assist them in planning educational applications of telecommunications technology.

The TAP projects provided information and educational services to representatives of the education (administrators, educators, students), health care, and public sectors. Sixteen Massachusetts institutions served as host receive sites for the projects; four served as host origination sites (See Appendix II). In addition, seven community health centers regularly received educational services through the TAP on their own premises. Project receive sites were located in 15 cities and towns throughout Massachusetts; one project was received at universities throughout the country.

MCET used existing telecommunications capacity and temporary leased capacity to conduct interactive teleconferences and telecourses (see Appendix III.). Fourteen cable operators provided capacity as a "last mile" link to receive sites; one cable operator provided capacity for project transmission.

Each project was independently evaluated by the Lincoln Filene Center for Citizenship and Public Affairs to determine the project's success in meeting the sponsor's educational objectives. Evaluation included in-depth surveys and interviews with participants. MCET reports about and evaluates the technical operations of each project.

The following report summarizes the activities and expenses of the Technical Assistance Program during FY 1987, and describes the proposed TAP plan for FY 1988.

Technical Assistance Program

FY 1987 Summary of Activities
Summary of Events

FY 1988 Objectives and Activities

Table of Contents

		Page #
Summary of Activities		2
I.	What has MCET learned about the educational telecommunications market in Massachusetts? Who comprises the market?	2
II.	What services are needed by institutions to enable them to apply telecommunications technology to education?	4
III.	What existing telecommunications capacity is available to educators in Massachusetts?	5
IV.	How can MCET improve on existing services?	6
Summary of Non-Reimbursable Expenses		8
Summary of Reimbursements		9
Technical Assistance Program Fiscal Year 1988		10

Appendices

Appendix I: FY 1987 TAP Demonstration Projects

Appendix II: Host Teleconference Facilities

Appendix III: Existing Capacity Utilized in FY 1987

Appendix IV: Cable Operators that have Provided Service

Appendix V: TAP Project Inquiries

Technical Assistance Program
Fiscal Year 1987
Summary of Activities

The goal of the Technical Assistance Program (TAP) is to prepare the Corporation and potential users for network operations. Its primary objective was to conduct demonstration projects that help determine:

I. The educational telecommunications market in Massachusetts;
II. Those services needed by institutions that enable them to apply telecommunications technology to education;
III. Existing telecommunications services available to educators in Massachusetts;
IV. The ways that MCET can improve on existing services.

Outreach for the program was limited to those agencies and institutions that participated in the MCET needs assessment and/or sought MCET services as a result of their interest and need to use telecommunications for education.

The following outline summarizes the information that has been determined through the TAP demonstration projects:

I. What has MCET learned about the educational telecommunications market in Massachusetts? Who comprises the market?

The educational telecommunications market in Massachusetts includes agencies and institutions that would use a telecommunications network to:

-- Provide information and educational services;

-- Receive educational telecommunications services on a regular or periodic basis;

-- Provide the means for others to produce or receive educational telecommunications services.

A. **Provide information and educational services.**
The nine institutional sponsors of TAP projects produced video and computer software that provided information and educational services. They represent the following sectors:

- public and private higher education,
- health care,
- state agencies, and
- special education (K-12).

The sponsors provided information and educational services through:

- interactive teleconferences and telecourses (one-way full motion video with audioconferencing, two-way full motion video),
- computer bulletin board/message service.

MCET provided consulting services to an additional 40 agencies and institutions from the following sectors (see Appendix V.):

- Education (Higher Education, K-12, Adult Education),
- Health Care,
- Special Needs/Special Interest,
- Municipalities,
- State/Economic Development Agencies,
- Business, and others.

B. **Receive educational telecommunications services on a regular or periodic basis.**

Receivers of telecommunications-delivered educational services through the MCET TAP projects were representative of the following sectors:

- educators (K-12 and post-secondary),
- health care professionals,
- senior level public managers,
- high school principals,
- college and university administrators,
- college students, and
- parents of school-age deaf children.

"The Physics Forum," sponsored by the University of Massachusetts Physics and Astronomy Department, and "Health Net," sponsored by the Boston University Area Health

Education Center, identified high school physics and chemistry teachers and health care professionals at community health centers respectively as sectors that have the need and interest to receive educational telecommunications services on a regular basis.

C. **Provide the means for others to produce or receive educational telecommunications services.**

Seventeen Massachusetts institutions agreed to share their facilities for use as origination and/or receive sites for the TAP projects. Many institutions allowed the use of their facilities at no charge. Attached is an outline of the resources and costs of facilities used at four institutions which provided origination facilities and sixteen that provided receive site facilities. (See Appendix II.) These institutions represent the following sectors: **higher education** (state colleges, universities and community colleges; private colleges and universities), **public schools and libraries.**

II. **What services are needed by institutions to enable them to apply telecommunications technology to education?**

A. When the TAP was initiated, MCET provided the following services:

1. Consulting services to:

   - Design a telecommunication plan for each project;
   - Determine project transmission costs;
   - Assist in pre-production planning;
   - Report on project technical efficiency;
   - Contract with independent evaluator to determine the success of each project in meeting the sponsor's educational objectives;

2. Subsidizing 75% of the transmission costs;

3. Brokering telecommunications capacity, production facilities, and receive site facilities;

4. Supervising project implementation;

5. Training Site Coordinators through workshops and and designing site coordinator handbooks specific to each project.

B. Other necessary services needed by institutions that were identified through the TAP include:

1. Production consultation services:

- Training of Instructional Media personel to adapt skills to telecommunications technology;

- Provision of production-related materials & resources;

- Assistance in planning and producing video-based telecommunications services.

2. Receive site certification: Receive site space and facilities are critical for the effective use of telecommunications technology. MCET is developing uniform receive site standards to apply to future projects.

III. What existing telecommunications capacity is available to educators in Massachusetts?

TAP projects utilized existing telecommunications capacity for: full-motion video services (one-way and two-way), audioconferencing, and a computer bulletin board/message service.

A. Full-motion video capacity:

1. Sources of existing transmission capacity: The two primary telecommunications services used as the major transmission "highways" for full motion video applications were the SportsChannel microwave and satellite network, and the duplex WGBH/House of Representatives InterCity Relay Systems (See Appendix III).

These main "highways" were linked to origination sites and receive sites via Boston Catholic Television (ITFS), local cable television systems (See Appendix IV), temporary microwave capacity leased from Boston University, New England Satellite Systems, Inc., and New England Telephone Company (See Appendicies III., IV).

2. Limitations of existing full motion video transmission capacity: SportsChannel is only available to MCET before 11 a.m. during nine months of the year. During the remaining 3 months, it is available before 4 p.m.,

Tuesdays through Fridays. (MCET is the exclusive broker for non-profit use of SC capacity.) Capacity on the Intercity Relay System is subject to last minute cancellations.

Full motion video programming can be originated at reasonable cost via existing capacity from the Boston and Springfield areas only.

3. Receiving capacity: Agencies and institutions throughout the state are generally able to receive services via existing telecommunications capacity if they:

   - Own a satellite receive antenna, or use the facilities of another institution with a satellite receive antenna;

   - Lease a satellite antenna for the project;

   - Receive cable television services, or use the facilities of another institution that receives cable television services.

B. Audioconferencing: One-way, full motion video projects were paired with existing audioconferencing services to enable all sites to interact.

Audioconferencing services were purchased primarily from MultiLink, Inc. in Lynn, Massachusetts. Projects primarily utilized the "dial out" service. For the national teleconference, MCET used MultiLink's toll-free 800 number service.

Other audioconference vendors used for the TAP include The Darome Connection, Danbury, Connecticut, and Public Service Satellite Consortium, Washington D.C.

C. Computer bulletin board/message service: MCET subsidized an 800 voice grade telephone line for the "Physics Forum," to enable high school physics teachers to access the service at no cost.

IV. How can MCET improve on existing services?

While existing capacity has enabled us to undertake a limited number of pilot projects, an effective, extensive and affordable statewide or regional telecommunications network must provide capabilities and services not currently possible. Such a network should provide:

A. More affordable access to full motion video telecommunications services for institutions that plan to provide information and educational services, particularly those outside of the Boston area;

B. Increased flexibility and capacity for scheduling teleconferences and telecourses;

C. Improved technical quality of transmission services and receive equipment;

D. More affordable data communications services, especially for high school teachers;

E. Highly demanded information about the use of telecommunications and educational technologies;

F. More information about, and access to, existing educational telecommunications materials and programs, e.g., telecourses and teleconferences; and

G. Coordination among, and permanent links to, institutions with production and receive site facilities available for public use.

TECHNICAL ASSISTANCE PROGRAM

Fiscal Year 1987

Summary of Non-Reimbursable Expenses

Transmission Capacity: MCET subsidizes 75% of transmission costs for demonstration projects. Reimbursed costs are not included in this summary.)	
WGBH/House of Representatives InterCity Relay System: bulk purchase of 165 hours @ $100/hour, 11/1/86 - 10/31/87	$16,050
SportsChannel microwave and satellite network @ $450/hour	10,575
New England Sports Network: 2 hours @ $505/hour (MCET subsidized full cost)	1,010
New England Telephone/AT&T 800 service	15,000
Harvard Information Transfer System @ $50/event plus $1/minute/direction plus equipment	555
Boston Catholic Television (sublease from Boston University @ $85/hour)	255
23 Ghz. supervision, survey, installation	3,100
6 Ghz. installation, supervision, survey	2,500
ITFS: survey, equipment, installation	670
MultiLink @ $.28/minute/site plus long distance charges	3,700
Subtotal:	$53,415
Consultants	
Lincoln Filene Center for Citizenship and Public Affairs: evaluation	25,000
Mark Bell Broadcasting Enterprises: site surveys, microwave supervision	650
HOME, Inc.: video production	2,780
ASL interpreters	250
Subtotal:	28,680

Summary of Expenses

Equipment

(2) Shure AMS 8000 and microphones	6,497
Phone installation and service	280
Subtotal:	6,777
Travel	1,300
TOTAL	$90,172

Summary of Reimbursements:

MCET brokers transmission, production and receive site facilities, and provides audioconference equipment for one-way, full motion events. PRoject sponsors are responsible for all costs relating to production, receive site facilities, audioconference equipment and 25% of the transmission costs. Below is a summary of reimbursements related to transmission and audioconference equipment.

Transmission	6,685
Equipment	3,640
TOTAL:	**$10,325**

Technical Assistance Program

Fiscal Year 1988

The goal of the Technical Assistance Program for Fiscal Year 1988 (year 2) has been expanded: To prepare the corporation **and its market** for network operations. The following outlines the proposed objectives and activites:

Objective I:

To retain the involvement of TAP project sponsors in the use of educational telecommunications services, MCET, and new educational technologies.

Activities:

A. Conduct a day-long conference in September 1987 at the World Trade Center. Workshops at the conference will include:

- Introduction to Teleconferencing;
- Directing a Teleconference;
- Educational Telecommunications Technologies and their Applications.

Selected project sponsors will serve as panelists. The keynote address will focus on the MCET Network.

B. Provide consulting and brokering services for sponsors planning to continue or expand their use of educational telecommunications services. (We are not inclined to provide repeated subsidies for previous sponsors, but will consider doing so for especially unique or attractive projects.)

C. Develop and distribute TAP demonstration project outreach materials to those institutions which express need and interest in educational applications of telecommunications technologies.

Objective II:

To involve at least 35 additional institutions in the Technical Assistance Program.

Activities:

A. Implement five demonstration projects providing services for:

- K-12 math, science, foreign language instruction, and teacher training;
- small private colleges; and
- businesses.

B. Develop and implement "Telecourse Forum," co-sponsored by the Annenberg/CPB Project. The Forum will encourage the use of existing telecourse material for higher education.

C. Plan and implement a multi-state conference for K-12 educators on the use of educational telecommunications services. The three-day conference, proposed for April 1988, will be co-sponsored by MCET, the Massachusetts Department of Education Bureau of Educational Resources, and the New York State Department of Education Center for Learning Technologies.

Objective III:

To expand the Technical Assistance Program.

Activities:

A. Provide production consultation services:

- Produce teleconferencing handbook;
- Develop guidelines for telecourse production.

B. Develop project receive site certification process.

C. Publicize the Technical Assistance Program projects through the media, mailings, MCET brochure, MCET Newsletter, participation in conferences.

D. Provide consulting services to those institutions and agencies that request assistance in planning for the use of educational telecommunications technology, and implement five demonstration projects with selected institutions.

Appendicies

Appendix I.	FY 1987 TAP Demonstration Projects
Appendix II.	Host Teleconference Facilities
Appendix III.	Existing Capacity Utilized in FY 1987
Appendix IV.	Cable Operators that have Provided Service
Appendix V.	TAP Project Inquiries

Appendix I.

FY 1987 Technical Assistance Program: Demonstration Projects

DATE	TITLE	SPONSOR	PURPOSE	FORMAT	ORIGINATION POINT	RECEIVE SITES	EXISTING TECHNOLOGY	TEMPORARY LEASED	TOTAL	MCET TOTAL
9-22-86	"Creating the Future: Teamwork & Innovation in the Mass. Economy"	Governor's Ofc of Economic Development	Discuss issues of economic policy w/educators, labor leaders, business reps. and college students	One-way video with audio-conf	UMass at Boston	UMass Amherst, Southeastern Mass. Univ., N. Dartmouth; UMass Med. Ctr. at Worcester	New England Sports Network	6 Ghz microwave (New England Telephone)	(appx) $20,000	$4,272
10-86 / 6-87	Physics Forum	Dept. of Physics & Astronomy, UMass Amherst	Computer bulletin board & message service for high school Physics teachers in Mass.	Voice grade 800 telephone # at UMass	UMass at Amherst	Statewide access	Telephone service		29,500	15,000
11-13-86 12-16-86	Public Policy Forum: "The Right to Know"; "The Changing Nature of Federal Funding"	Inst. for Gov't Srvcs, UMass Amherst	Involve senior level public mgrs & elected officials in discussion & examination of controversial topics	Two-way video	Spfld Tech Comm Coll, Gutman Conf Ctr at Harvard University in Cambridge	Spfld Tech Comm Coll, Gutman Conf Ctr in Camb.	House of Reps. InterCity Relay System (WGBH); Continental Cablevision of Spfd; New England Tel. video link (Harvard - WGBH)		6,011 *not including production costs *$14,190	4,312 $8,850
2-27-87	HealthNet: "Results in a Landmark Study in Hypertensiveness"	Boston Univ. Area Health Educ. Center	Continuing ed. for health care professionals	One-way video/ audio-conf.	Boston Univ.	North Shore Comm Health Ctr, Peabody; Manet Comm. Health Ctr, Quincy; Watertown Public Library (Watertown Health Ctr); Greater Lwrnce Family Hlth Ctr; Brightwood - Riverview Hlth Ctr, Spfld; Neighborhood Hlth Ctr, Spfld;	Boston Univ. ITFS network; Boston Catholic Television, SportsChannel satellite & microwave network; House of Reps. InterCity Relay (WGBH); Continental Cablevision of Spfld; Bay State Med. Ctr	23 Ghz (Boston University)		
3-13-87	"Rheumatoid Arthritis: When NSAIDs Fail"									
3-27-87	"Rheumatoid Arthritis (cont)"									
4-10-87	"Congestive Heart Failure"									
4-24-87	"Recurrent Peptic Ulcer Disease"									

DATE	TITLE	SPONSOR	PURPOSE	FORMAT	ORIGINATION POINT	RECEIVE SITES	EXISTING TECHNOLOGY	TEMPORARY LEASED	TOTAL	MCET TOTAL
5-1-87 5-15-87	"Treatment of the Diabetic Foot" "Chronic Osteomyolitis"					Wesson Memorial Unit, **Spfld** Wesson Women's Unit, **Spfld.**	Educ. Network; Continental Cablevision of Lwrce; Continental Cablevision of Watertown; Admas-Russell Cablevision, Peabody; American Cablesystems, Quincy			
4-8-87	"Confronting AIDS on the Campus"	Mass. Dept. of Public Health	AIDS info. for college campus Deans of Students & administrators	One-way video, audioconference	Bunker Hill Comm Coll	UMass **Boston,** Northern Essex Comm Coll, **Haverhill;** Southeastern Mass. Univ., **N. Dartmouth;** **Wor.** Polytechnic Inst.; Western N.E. Coll, **Spfld.**	SportsChannel satellite network; Greater Wor. Cable	23 Ghz (New England Satellite Systems)	5,220	2,400
4-28-87	"Teaching AIDS in High School"	Mass. Dept. of Public Health	Info for high school teachers, principals & school cmmtts	One-way video, audioconference	Bunker Hill Comm Coll	UMass **Boston;** Ctr for Field Srvs, Univ of **Lowell,** Southeastern Mass. Univ, **N. Dartmouth;** Western NE Coll, **Spfld;** Berkshire Comm Coll, **Pittsfld;** Wachusett Comm Coll, **Gardner;** Wachusett Reg. High School, **Holden.**	SportsChannel satellite network Colony Comm Lowell	23 Ghz (NE Satellite Systems)	5,993 (estmt)	2,540 (estmt)

DATE	TITLE	SPONSOR	PURPOSE	FORMAT	ORIGINATION POINT	RECEIVE SITES	EXISTING TECHNOLOGY	TEMPORARY LEASED	TOTAL	MCET TOTAL
5-8-87	"Invisible Experiences"	Deaf Media Coalition; BU Ctr for the Study of Communication & Deafness	To discuss methods of communication used in the educ. of the Deaf for parents of Deaf children, professionals, & members of the Deaf Comm.	One-way video, audioconference (bi-lingual: English, ASL)	Boston Univ.	Bunker Hill Comm Coll, **Boston;** Southeastern Mass Univ, **N. Dartmouth;** Northern Essex Comm Coll, **Haverhill;** South High Comm Schl, **Wor.; Spfld** Tech Comm Coll	BU ITFS netwrk; Boston Catholic Television; SportsChannel satellite network; House of Reps. InterCity Relay System (WGBH); Continental Cablevision of Spfld; Greater Wor. Cable, Inc.	23 Ghz (BU)	6,350 (estmt)	3,200 (estmt)
5-12-87	"The Regional Math Netwrk"	The Regional Math Network at the Harvard Grad. School of Education	To present a model for a univ run middle school math teacher invigoration prog.	One-way video; 800 no. call in	Bunker Hill Comm College	**Nat'l** telecon.	SportsChannel satellite network	23 Ghz (NE Satellite Systems)	3,500 (estmt)	1,850 (estmt)

Appendix II.

Host Teleconference Facilities

TECHNICAL ASSISTANCE PROGRAM

Fiscal Year 1987
Host Teleconference Facilities

Site	No. of Projects/ Purpose	Facilities Used	Cost/project
Berkshire Community College	1/receive	C-Band antenna, meeting space, video, projection, telephone service, technical supervision	waived
Boston University	8/origination	Studio production - three camera facilities and crew.	$1,250/full day
		23 Ghz to BCTV, ITFS transmission on BCTV, Portable 23 Ghz to WGBH	$85/hour
Bunker Hill Community College	3/origination	Studio production - three camera studio and crew	$150/hour
	1/receive	C-Band antenna, meeting space, video projector, monitors, technical supervision	waived
Center for Field Services, University of Lowell	1/receive	Meeting space, cable TV services, monitors, telephone service, technical supervision	waived

Site	No. of Projects/ Purpose	Facilities Used	Cost
Gutman Conference Center, Harvard University, Cambridge	2/origination & receive	Harvard Information Transmission System (switching)	$50/event
		duplex video link to WGBH (NETel)	$1/min/dirctn
		transmission equipment	$80/event
		meeting space	waived
		production services	appx $250/hour
		monitors w/stands	$10.50/each
		set-up	$60/hour
Mt. Wachusett Comm. College, Gardner	1/receive	C-Band antenna, monitors, telephone service, meeting space, technical supervision	waived
Northern Essex Comm. College	2/receive	C-Band antenna, meeting space, monitors, telephone service, technical supervision	waived
South High Community School, Worcester	1/receive	Meeting space, C-Band antenna, telephone service, monitors, technical supervision	waived
Southeastern Massachusetts University, N. Dartmouth	4/receive	C-Band antenna, video projector, meeting space, telephone service, technical supervision	waived

Site	No. of Projects/ Purpose	Facilities Used	Cost
Springfield Technical Community College	2/origination & receive	Studio production facilities and crew	discounted @ $650/2 hr event (appx $100/hr)
		Cable television upstream/ downstream capacity, meeting space, telephone service, montiors, technical supervision	waived
University of Massachusetts, at Amherst	1/receive	Leased C-Band antenna	$1,028
		leased video projector	$350
		meeting space; telephone service, technical supervision	waived
University of Massachusetts, Boston	1/origination 2/receive	Contracted Production Services	N/A
		C-Band antenna, meeting space, phone service, video projector	$875/event discounted to $600/event
University of Massachusetts Medical Center, Worcester	1/receive	Leased C-Band antenna	waived
		video projector, meeting space, telephone service, technical supervision	waived

Site	No. of Projects/ Purpose	Facilities Used	Cost
Wachusett Regional High School, Holden	1/receive	C-Band antenna, monitor, telephone service, meeting space, technical supervision	waived
Watertown Public Library	7/receive	Meeting space, phone service, television, cable TV service	no fee
Western New England College, Springfield	4/receive	C-Band antenna, meeting space, video projector, PA system, telephone service, technical supervision	$300/event
Worcester Polytechnic Institute	1/receive	Meeting space, telephone service, cable TV service, technical supervision	$150

Appendix III.

Existing Capacity Utilized in FY 1987

TECHNICAL ASSISTANCE PROGRAM

Existing Capacity Utilized in Fiscal Year 1987

Provider	Description	Cost	Advantage	Disadvantages
1. SportsChannel (SC)	One-way, full motion video microwave and satellite network	$450/hour ($200/hr for microwave network only)	- microwave and satellite networks are received at over 100 cable TV headends in MA. - satellite capacity has national footprint.	- limited time available. - technical quality: SatCom IV not easily received by small antennas (i.e., less than 5 meters). - limited insert capacity: 150 Causeway Street in Boston and Woburn tower.
2. WGBH/House of Representatives InterCity Relay System (ICRS)	- duplex, full motion video capacity linking WGBH in Boston to WGBY and Continental Cablevision's headend in Springfield. - one-way, full-motion video from Boston linking cable TV headends in: Springfield, Chicopee, North Adams, Pittsfield, Great Barrington.	$100/hr/directn (Discounted price based on bulk purchase).	- ability to provide two-way video interactive services. - duplex link with cable TV headend in Spfld enabling any institution in Spfld with upstream capacity to provide program origination services to Boston.	- limited insert points: institutions in Spfld with upstream capacity; WGBH in Boston. - limited receive points; cable service subscribers in Spfld, Chicopee, Pittsfield, Great Barrington, North Adams, WGBH in Boston. - subject to last minute cancellations.

Provider	Description	Cost	Advantage	Disadvantages
3. Boston Catholic Television (BCTV)	ITFS: (4 channels) transmitter in Boston; active repeaters in: Andover, Framingham.	subleased (2 channels) from Boston University @ $85/hr	- line of sight to SportsChannel insert point in Woburn. - BU channels linked Cablevision of Boston headend.	- limited time available. - relies on line of sight to transmitters or repeaters. - insert in Boston only. - poor transmission quality (especially Channel D2).
4. New England Sports Network	satellite network	$505/hour	- satellite service with national footprint (same satellite as SportsChannel) - access to cable TV headends.	- very little capacity available. - requires program approval on a case by case basis. - insert point at the Fenway in Boston and uplink in Needham only.
5. Cable television systems	14 cable systems provided serviced (May 1986 - June 1987)	waived in each case	- very effective "last mile" link for projects utilizing SportsChannel. - good technical quality. - many educational, municipal, health care agencies throughout the state receive cable service.	- transmission generally requires switching at headend

Provider	Description	Cost	Advantage	Disadvantages
			- many systems with addressable capacity - institutions with upstream capacity in Spfld and Boston have affordable accesss to insert points for the ICRS and SC respectively	
6. MultiLink, Inc.	Audioconferencing service	$.28/minute/site	- operator assisted - Lynn, MA phone number minimizes long distance charges	- expensive
7. New England Telephone, AT&T	Intralata and Interlata WATS 800 service	100 hrs/month @ appx $1300.	wide area teleconmunications service (WATS) access.	- expensive

Appendix IV.

Cable Operators that have Provided Service

TECHNICAL ASSISTANCE PROGRAM

Cable Operators That Have Provided Service

Cable Operator	Number of Proj/Purpose	Sites	Service Provided	Cost
Continental Cablevision of Springfield	10/receive 2/originate	Springfield Technical Community College Bay State Medical Center Wesson Memorial Wesson Women's Unit Brightwood - Riverview Health Center Neighborhood Health Center	upstream capacity (STCC to headend) duplex capacity between headend and WGB technical supervision installation of service switching: - ICRS to local headend - SC to local channel	waived
Continental Cablevision of New Hampshire, Inc. (Lawrence)	7/receive	Greater Lawrence Family Health Center	cable service installation, SportsChannel service	waived
Continental Cablevision of Watertown	7/receive	Watertown Public Library	SportsChannel service	waived
Adams Russell Cablevision, of Peabody, Inc.	7/receive	North Shore Community Health Center	installation of service, SportsChannel service	waived
Lowell Cable Television, Inc. (Colony Communications, Inc.)	1/receive	Center for Field Services, University of Lowell	switching: SC to local cable	waived

Cable Operator	Number of Proj/Purpose	Sites	Service Provided	Cost
Quincy Cablesystems, Corp. (American Cablesystems)	7/receive	Manet Community Health Center	installation; basic service switching: SC to local channel	waived; $8.50/mo. waived
Greater Worcester Cable, Inc.	2/receive	Worcester Polytechnic Institute	switching: SC to local channel techical consulting, and supervision	waived
Greater Media, Inc. (6/86) (Holden)	1/receive	Greater Media Studio	meeting spacce, telephone service, SC service, monitors, technical supervision	waived
Continental Cablevision, South Hadley (6/86)	1/receive	South Hadley Public Library	SC service	waived
Warner Cable, Somerville (6/86)	1/receive	Somerville Center for Adult Learning Experiences	addressable SC service, addressable converter box	waived
Cablevision of Boston (5,6/86)	2/receive	Jackson/Mann Community School Gavin Middle School	SportsChannel service	waived
Rollins Cablevision of Mass., Inc. (Dracut)	1/receive	Dracut High School	SportsChannel service	waived

Cable Operator	Number of Proj/Purpose	Sites	Service Provided	Cost
Greater Media Cablesystems, Chicopee	1/receive	Chicopee Public Schools TV Center	SportsChannel service	waived
Times-Mirror Cable TV of Pioneer Valley, (5/87)	1/receive	Greenfield Community College	SportsChannel service and de-coder	waived

Appendix V.

FY 1987 TAP Project Inquiries

TAP Project Inquiries (FY 1987)

Sector		Institution
I. Education:		
A. Higher Education		
	1. Public	- Massachusetts College of Art/ Pro-Arts Consortium
		- Southeastern Massachusetts University, School of Nursing
		- Roxbury Community College
		- Greenfield Community College
		- Framingham State College
		- Bridgewater State College
		- U.Mass Amherst, School of Engineering
		- U.Mass Boston, Center for Communications Media
		- University of Lowell, Center for Field Services
		- Harvard University, School of Education
	2. Private	- Central New England College
		- Boston University
		- Northeastern University
		- Western New England College
B. K-12		- The Education Cooperative, Wellesley
		- Massachusetts Teachers Association
		- Middleborough Public Schools, Project Contemporary Competitiveness
		- Boston Public Schools

Sector	Institution
C. Adult Education	- Continuing Education Institute, Medford
II. Health Care	- New England Medical Center
	- Mass. Hospital Association
III. Special Needs/ Special Interest	- Adaptive Environments, Boston
	- Adaptive Design Ctr, Lakeville, MA
	- Center for Successful Aging, Barnstable, MA
IV. Municipalities	- New England Public Power Association
	- City of Sprfld, Health Department
V. State/Economic Development Agencies	- Mass. Dept. of Public Works
	- Bay State Skills Corporation
	- Office of Economic Affairs - Innovation Program
	- Governor's Education Office
	- Mass. Office of Training and Employment Policy
	- Polymer Center
	- Photovoltaic Center
VI. Business	- New England Commons
	- Growth Opportunity Alliance of Greater Lawrence
VII. Other	- Hampshire County Commission
	- U.S.S. Constitution Museum
	- Mass. Pub. Employees Health and Welfare Facilities
	- Boston Community Access and Programming Foundation; International Women's Day Committee
	- Project Optimus/Kai (special education training)

APPENDIX 2

EDUCATIONAL TELECONFERENCING IN MASSACHUSETTS:

SUMMARY EVALUATION OF THE MASSACHUSETTS CORPORATION FOR EDUCATIONAL TELECOMMUNICATIONS' TECHNICAL ASSISTANCE PROGRAM (FISCAL YEAR 1987)

Prepared by Athena Lee Bradley of the Lincoln Filene Center
for Citizenship and Public Affairs at Tufts University

September 15, 1987

EXECUTIVE SUMARY

The Massachusetts Corporation for Educational Telecommunications (MCET), through its Technical Assistance Program (TAP), co-produces projects that demonstrate a variety of educational applications of telecommunications technology. Demonstration projects are co-produced by MCET in association with Massachusetts institutions and agencies throughout the state. These demonstration projects are selected on the basis of specific criteria. The "Pilot Project Criteria" guidelines contained in Appendix A of this report provides greater detail about this selection process.

MCET contracted with the Lincoln Filene Center at Tufts University to evaluate five TAP demonstration projects produced between November 1986, and May 1987. Oral interviews, conducted with project co-producers and receive site coordinators, and written questionnaires, completed by project participants, formed the basis for these evaluations. This final report summarizes the data and information gathered from the demonstration projects and presents some new information derived from patterns among all of the projects.

The application of telecommunications enabled project co-producers to communicate a diversity of issues to people all over the state, while utilizing a limited pool of speakers. Through the projects, co-producers were able to reach participants at locations that they otherwise may not have been able to, and without participants having to travel very far to attend the events. Application of the medium proved successful for the co-producers in terms of allowing them to test it for possible future uses. Project co-producers viewed the application of telecommunications as a worthwhile learning experience. Overall, participants felt comfortable with the telecommunications medium, and rated the events very highly. The interactive format allowed participants to communicate with colleagues from all around the state, as well as to receive the information presented in each of the projects.

The demonstration projects evaluated by the Lincoln Filene Center applied three different types of telecommunications technologies. One project utilized two-way interactive video, another used a computer bulletin board and message service, and the remaining projects applied one-way video and audioconferencing. The Massachusetts Corporation for Educational Telecommunications brokered and coordinated the telecommunications network system for all of the video-based projects, offering technical preparation and services prior to, and during the telecommunications events. MCET also participated in site selection and site preparation for the video-based projects. The project co-producers were responsible for the program of each event, including all content-related aspects. Co-producers were also responsible for all outreach for the projects.

Among all participants in the TAP demonstration projects, 83.6 percent gave an overall rating to the projects of either "excellent" or "good." When asked to rate various aspects of the telecommunications projects, including "learning more about the issues presented" and "the use of telecommunications," at least 85.7 percent of the participants gave the

events a rating of "satisfactory" or better on all elements. Participants were also asked to compare the telecommunications events to other in-person conferences or workshops they had attended in the past. An average of 86.9 percent of those responding viewed the events as either "more effective" than, or "about as effective" as, other conventional conferences or workshops they had attended.

Unseasonably bad weather interferred with transmission at some receive sites for one project, understandably affecting the views of the project co-producer and the participants at the affected sites. Nonetheless the project was judged highly, with at least 80 percent of those responding to our questionnaire rating the events either "excellent" or "good."

The telecommunications services provided by MCET were viewed by all of the demonstration project co-producers as exceptional. MCET was noted by one of the co-producers as providing "excellent assistance and support," and by another as being "absolutely invaluable."

One of the goals of MCET's Technical Assistance Program is to provide support for demonstration projects that have the potential to be expanded upon and repeated on a regular basis. This goal was successfully reached in three of the five demonstration projects evaluated by the Lincoln Filene Center. Two of the telecommunications demonstration projects have been expanded and will be repeated on a non-demonstration basis. A third co-producer is, as of the writing of this report, actively planning another project.

A large part of the evaluation process for the demonstration projects also involved soliciting comments from participants and co-producers on how they felt about the projects, and in which ways they felt the projects could be improved. Suggestions for future events included:

-- Greater on-site participant interaction. Pre-teleconference introductions where participants could meet each other formally, and facilitated informal discussions held during breaks are two examples. In addition, the pre-teleconference introduction should include: a brief statement about the telecommunications medium, a list of the players for an event, an explanation of exactly what will happen during the question and answer period, and a description of potential problems that might arise during the event and what will be done about them.

-- Full consideration for the comfort of teleconference participants. The "little things," including having coffee and pastries prior to the telecast, making sure there are breaks every hour or two, and providing a lunch period (if appropriate) with suggestions about where to go, or notification (in advance) that a brown bag lunch should be brought, are important at teleconference events in order to make participants feel more familiar and comfortable with the medium. Also, weekend and evening times should be considered for participants who cannot attend teleconferences as part of their employment.

-- More efficient use of the teleconference question and answer period. In some of the teleconference events the moderator posed questions to all

panelists who wanted to answer. Teleconference time constraints do not always allow this flexibility, and participants often grow restless waiting for their turn to ask questions. It is also extremely important that either the moderator or panelists repeat questions asked via the audioconferencing network before they are answered.

One demonstration project included an on-site question and answer period with resource people. This format, when appropriate, might be a good one to promote, perhaps tying it in with a brown bag lunch.

-- Guidelines for program format which take into account the proposed target audience and the timeline for a telecommunications event. Such guidelines might include sample presentation formats, suggested background materials, ideas on how to improve participant interaction, etc. Also, clear and uniform guidelines for the use of visual aids (i.e., size, lettering, color, etc., of charts, pictures) should be established.

-- Further clarification of the role of the site coordinator, who represents the producers, and the role of the host, who represents the receive site institution. Details involving the site location (i.e., the placing of signs signifying where the viewing room is, where the restrooms are, etc.) and the comfort of the viewing room (including making sure there is no glare on the television set, and that the room temperature is okay) require greater attention.

-- Increased emphasis on proper receive site "protocol" during a teleconference event. Use of the "help" phone number given by the MCET staff for emergencies should be stressed as the only way to contact the staff after a teleconference has begun.

-- The avoidance of large rooms (e.g., gyms) as teleconference receive sites whenever possible. Such spaces are too large for participants to feel comfortable speaking, and may inhibit their ability to view the event.

-- Financial assistance, loan arrangements, or more concrete suggestions on how to obtain additional funding for telecommunications projects. In developing public relations materials, MCET might place greater emphasis on the positive aspects of telecommunications in terms of cost savings and "cost alternatives." For example, potential savings in speakers' fees, less staff travel time, etc. Also, greater emphasis on packaging the medium might help alleviate some concerns about the costs, including: stressing the convenience of telecommunications for the participants (not having to travel far, etc.); the "excitement" for the participants in using the medium (being able to talk to peers across the state, etc.); the role of telecommunications as a public service; and multiple uses of the medium, such as using video tapes of the events.

The evaluation of the TAP demonstration projects has shown that the use of telecommunications for education is very effective for providing increased access to information and educational services. People with a wide variety of backgrounds participated in the demonstration projects. The target audiences for the projects included: administrators and educators who participated in discussions about current public policy issues; health

practitioners who received continuing education credits; high school teachers, college administrators, and institutional health services staff who discussed policies and curricula about AIDS; Deaf professionals, parents of Deaf children, and others who discussed education of the Deaf; and science teachers utilizing a computer bulletin board and message service to share resources and ideas.

Preface

The Lincoln Filene Center for Citizenship and Public Affairs conducted independent evaluations for five telecommunications demonstration projects implemented by the Massachusetts Corporation for Educational Telecommunications (MCET) between November 1986, and May 1987. Oral interviews and written participant questionnaires were administered for each project, comprising the basis for the evaluations. These project evaluation reports, including copies of the participant questionnaires and oral interview questions for each project, are available from MCET.

This final report presents two types of information. The first consists of a summary of the main conclusions drawn from the individual project evaluations. The second consists of new information derived by aggregating the participants' questionnaire responses and comparing them across projects. The majority of the oral and written questions asked were similar for each project. Variations do exist, however, which will be apparent when reading this final report. In addition, the demonstration projects applied three different types of telecommunications technologies. One project utilized two-way interactive video, another used a computer bulletin board and message service, and the remaining projects applied one-way video and audioconferencing. Some of the questions asked of both the co-producers and the participants reflect these differences. Participants in the projects were also asked to make comments and suggestions about various aspects of the events. These comments were reported in full in the individual project reports; because of space limitations however, only a partial listing of such comments appears in this final report.

Reports of this type would not be possible without the cooperation and assistance of many people. Special thanks should be extended to all demonstration project co-producers and receive site coordinators who consented to be interviewed for the project reports. In addition, the evaluation process would not have been complete without the questionnaire responses received from participants in the events. Acknowledgement should also go to those who assisted in editing, and to Professor Kent Portney at Tufts University for his advice and support. Finally, appreciation should be extended to the staff of the Massachusetts Corporation for Educational Telecommunications for their cooperation during the process of evaluating the TAP projects. It has been a pleasure working, and learning, with them.

Table of Contents

Introduction.....Page 1

Part One: The Identification of User Requirements.....Page 4

The Need for Telecommunications Services.....Page 4

Future Uses of the Medium as Cited by Project Co-Producers.....Page 4

Profile of Project Participants.....Page 7

Ancillary Services Needed for an Educational Application of Telecommunications.....Page 14

The Services Provided by MCET.....Page 14

Additional Services Suggested by the Co-Producers.....Page 21

Participant Comments and Suggestions About Telecommunications.....Page 23

Suggestions Made by Receive Site Coordinators.....Page 26

The Benefits Derived from the Educational Application of Telecommunications.....Page 28

Project Goals.....Page 28

Other Benefits Associated with the Use of Telecommunications.....Page 35

Special Considerations for the Application of Telecommunications.....Page 36

The Participant Perspective.....Page 40

Financial Considerations.....Page 50

Part Two: The Program Objectives.....Page 52

Program Effectiveness.....Page 52

The Effectiveness of the Programs Based on the Participants' Expectations.....Page 52

The Effectiveness of the Programs Based on the Learning Experiences of the Participants.....Page 59

The Application of Telecommunications.....Page 64

The Length of the Project Events and Participant Interaction.....Page 64

Project Specific Aspects Relating to the Program of the Events.....Page 65

Participant Comments Regarding the Program Aspects of the Projects.....Page 68

Conclusion.....Page 71

Appendix A: Pilot Project Criteria.....Page 72

Appendix B: List of Interviewees.....Page 73

Introduction

The Lincoln Filene Center for Citizenship and Public Affairs, associated with Tufts University, offers a variety of educational and research services benefiting individuals and nonprofit organizations. Its Citizen Survey Program conducts independent evaluations for the Lincoln Filene Center as well as for outside parties. The Massachusetts Corporation for Educational Telecommunications (MCET) contracted with the Lincoln Filene Center to evaluate five demonstration projects implemented under its Technical Assistance Program (TAP).

The following is a brief description of the TAP demonstration projects evaluated by the Lincoln Filene Center, and included in this final evaluation report:

-- A two-part pilot project, The Public Policy Forum, was co-produced by the Institute for Governmental Services (IGS) at the University of Massachusetts, in Amherst. Part I of the project, produced on November 13, 1986, discussed "The Right to Know Legislation"; Part II, produced on December 16, 1986, discussed "The Changing Nature of Federal Funding: The Impact on State and Local Government." The project was composed of two interactive teleconferences linking panelists and participants located in Springfield and Cambridge, Massachusetts through a two-way video and audio network.

-- Health Net was co-produced by the Area Health Education Center (AHEC) at the Boston University School of Medicine. This continuing education service for health care professionals consisted of seven one-hour interactive telecourses that aired between February 27, 1987 and May 15, 1987.[1] Through the use of one-way video and audioconferencing, panelists located at Boston University were linked to participants at eight health care centers located throughout the Commonwealth.

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1. Evalations were conducted for the first and the last telecourses in the Health Net series.

-- The AIDS Education Series was co-produced by the Office of Human Resources at the Massachusetts Department of Public Health (DPH). The project consisted of two interactive teleconferences, each preceded by an on-site introduction and followed by an on-site discussion period. The first event, produced on April 8, 1987, was entitled "Confronting AIDS on Campus." It linked panelists at the origination site located at Bunker Hill Community College, in Boston, to participants at five receive sites throughout the Commonwealth via one-way video and audioconferencing. "Teaching AIDS in High School," the second event, which was produced on April 29, 1987, utilized one-way video and audioconferencing to link panelists at Bunker Hill Community College to participants at seven sites across the state. Both discussed various curricula and policy issues concerning the impact of Acquired Immune Deficiency Syndrome (AIDS) on educational institutions.

-- Invisible Experiences: Looking Back and Ahead was co-produced by the Deaf Media Coalition (DMC), an organization of Deaf media professionals, and Boston University's Center for the Study of Communication and Deafness (the Center). The six-hour event, produced on May 8, 1987, included two two-hour interactive teleconferences, a pre-teleconference introduction and a lunch break. Invisible Experiences utilized one-way video and audioconferencing to link five participant receive sites located throughout Massachusetts to panelists at the origination site at Boston University. This bilingual event, utilizing spoken English and American Sign Language (ASL), presented methods of communication used in the education of the Deaf.

-- The Physics Forum was co-produced by the Department of Physics and Astronomy and the Office of the President at the University of Massachusetts, Amherst, and by the Five College/Public School Partnership, Five Colleges, Inc. Established in May of 1986, the Physics Forum provides support for high school science teachers across Massachusetts through the use of an electronic bulletin board that includes both message services and text files.

The Massachusetts Corporation for Educational Telecommunications coordinated the telecommunications network system for all of the video-based TAP demonstration projects, offering technical preparation and services prior to, and during the project events. MCET also participated in site selection

and site preparation for these projects. Co-producers were responsible for the program of each event, including all content-related aspects, as well as all outreach for the projects.

The Lincoln Filene Center worked with MCET to produce short questionnaires to be answered by participants in each of the projects. The completed questionnaires were collected by receive site coordinators or MCET staff and later forwarded to the Lincoln Filene Center for detailed analysis. In-depth oral interviews were conducted with the key planners for the demonstration projects. Receive site coordinators for the events were also interviewed. A list of those interviewed may be found in Appendix B of this report.

The Lincoln Filene Center's final analysis of the TAP demonstration projects summarizes and aggregates the data and responses gathered from the questionnaires and the oral interviews. In general, the participant questionnaires sought to evoke opinions on a wide range of project aspects. These included: 1) questions about the telecommunications services provided; 2) a rating of each project's overall performance, as well as individual ratings of various elements of the events; 3) how the teleconferences compared in effectiveness to in-person conference formats; 4) the participants' expectations of the projects, and whether or not these were fulfilled; 5) participant knowledge of the issues presented prior to, and upon conclusion of the teleconferences; and 6) suggestions for improvement of the telecommunications medium. The oral interviews included questions pertaining to the benefits and applications of telecommunications, the effectiveness of services provided by MCET, and ways that the projects might be repeated or expanded.

This final evaluation report has been organized within a two-part framework. Part One identifies the telecommunications user requirements. It includes three sections: 1) the need for telecommunications services; 2) ancillary services needed for educational applications of telecommunications; and, 3) the benefits derived from the educational application of telecommunications. Part Two of the report summarizes the projects' program objectives and the application of telecommunications.

PART ONE: THE IDENTIFICATION OF USER REQUIREMENTS

The Need for Telecommunications Services

Future Uses of the Medium As Cited By Project Co-Producers

To help identify the need for telecommunications services, we asked the co-producers of each of the TAP demonstration projects if they were considering any future applications of telecommunications services for education. All but one of the co-producers responded affirmatively. The Area Health Education Center, co-producer of Health Net; the Department of Physics and Astronomy at the University of Massachusetts in Amherst, co-producer of the Physics Forum; and the Deaf Media Coalition, a co-producer of Invisible Experiences, will be repeating and expanding their projects. The Institute for Governmental Services, co-producer of the Public Policy Forum, has expressed interest in utilizing the medium again, but has not yet completed any final plans. Their comments follow.

Dr. Peter Bittel, Institute for Governmental Services, University of Massachusetts, Public Policy Forum

> "IGS would probably use telecommunications as an information disseminator.... We are thinking about sponsoring a teleconference on Acquired Immune Deficiency Syndrome (AIDS), but we need to work out the funding and other logistics."

Dr. Arthur Eve, Institute for Governmental Services, University of Massachusetts, Public Policy Forum

Dr. Eve's comments below were from an interview conducted upon completion of the project.

> "In general terms I would support using telecommunications for training. Perhaps combining the teleconferencing medium more with the types of conferences that we do to benefit state and local government employees. The use of one-way video with audio feedback on specific topics is how I think telecommunications might best suit IGS...."

A follow-up interview was also conducted with Dr. Eve. We wanted to know if, between the time that the project was completed and the time of the

writing of this report, IGS had made any further decisions regarding its use of the medium. Dr. Bittel, who is in charge of developing such projects was unavailable for comment. However, Dr. Eve remarked that IGS was enthusiastic about using the medium again in the near future.

> "We recently ran a very successful conference with the University Medical School on AIDS. We've begun detailed discussions about using telecommunications (one-way video and audioconferencing) to produce a teleconference on AIDS, using the Medical School as a resource. We would also like to utilize any videos derived from such an event. In addition, we are talking about using a two-way video approach for other topics. We'll be working on planning these this fall.
>
> "Cost is not an issue that has slowed us down in our planning. We assume that the University and state agencies would help us cover the costs of using the medium."

Dr. Frank Rife, Institute for Governmental Services, University of Massachusetts, Public Policy Forum

> "I would repeat anything that creates a widespread forum, broad and specific, basically similar to what we did with the pilot project.... It is a valuable tool for information dissemination, as a forum for clarifying issues, and as a discussion mechanism. It would also be of value for use in policy making and decision making, since the ability of everyone involved to hear what is being said, all at the same time, would allow for accurate, or at least the same, information to be discussed simultaneously."

Ms. Maryann Dwyer, Area Health Education Center, Boston University, Health Net

> "We will continue to use the medium and expand our teleseries to more sites and try to get even more interactivity among the participants. This fall we will start the series again. It will run through the spring, with a total of eighteen telecourses. We will expand the number of receive sites (to twenty) over the course of the season."

Ms. Deane Beebe, the Office of Human Resources at the Department of Public Health, AIDS Education Series

> "In general if we were to do another teleconference our goals would be about the same, to reach a lot of people across the state in a way that would limit their need to travel; and, to be able to draw upon a limited pool of speakers, so they also do not have to travel across the state. We haven't made any concrete plans, but two ideas have been discussed. One would be a general orientation to the AIDS curriculum guide for high schools.... We have also discussed using teleconferencing for a training for drug treatment counselors...."

Ms. Patti Wilson, Deaf Media Coalition, Invisible Experiences

> "The Deaf Media Coalition met last week, and discussed possible future uses of the medium. We would like to sponsor two more events, one on worldwide schools for the Deaf, and the other on Deaf history....we would like to try to get one together by December of 1987."

Dr. Robert Hoffmeister, Center for the Study of Communication and Deafness, Boston University, Invisible Experiences

> "I would use the medium in developing seminars and workshops to reach a wider range of people. Nothing specific has been discussed yet, though."

Dr. Morton Sternheim, Department of Physics and Astronomy, University of Massachusetts, Physics Forum

> "Since we started the Physics Forum, it has been under continuous expansion. It was intended originally for physics teachers, but it has since been expanded to other science areas.... We will keep on broadening the message areas though. I haven't given much thought to expanding the Forum beyond the science area. We do put some course offerings and announcements that are nonscience-related on the system, but if we expand too much, we run the risk of being too diffuse, and trying to operate with too many people on the system.
>
> "Ultimately I would like to see the Bulletin Board System (BBS) network incorporate the Echomail system, an automatic BBS. The software exists for the system and we have actually run it. The cost for the system is minimal, and could easily be used throughout the state and even the region. With Echomail, many BBS share information (through computers) automatically from one locality to another (i.e., state, regional, and national)...."

Profile of Project Participants

To help us further identify the need for telecommunications services, we asked participants in the various telecommunications projects to tell us their background (e.g., occupation). Telecommunications is clearly applicable to a wide-ranging audience as evidenced by the variety of backgrounds of project participants.

Almost 22 percent of the Public Policy Forum participants were administrators, while another 12.2 percent reported being in public safety. The remaining participants included public sector employees, educators, health professionals, and state administrators.

Registered nurses comprised the majority of the viewing audience for the Health Net series, ranging from 44.7 percent of those participating in the first event ("The European Working Party on High Blood Pressure in the Elderly") to 52.6 percent of those in the last event ("Chronic Osteomyelitis"). Other Health Net participants included physicians and nurse practitioners.

Almost half of the participants for the first AIDS Education Series event, "Confronting AIDS on the Campus," were either registered nurses (associated with college health services) or college administrators. The remaining ranged from students to college professors. For "Teaching AIDS in High School," the majority of participants were high school teachers, largely health or science teachers, and school nurses.

For the Invisible Experiences teleconference, over one-third of the responding participants were professionals working with the Deaf, 22.5 percent were Deaf professionals, and another 17.5 percent were parents of Deaf/hard of hearing children. The remaining respondents included American Sign Language students and a Deaf college student.

Approximately 70 percent of the Physics Forum users who responded to our questionnaire stated that they were high school teachers, with about one-fourth of these being physics teachers. Included in the remaining 29.5

percent were computer coordinators, and college professors.

A complete tabulation of the reported backgrounds of the project participants appears in the table below. The table includes the project title, followed by the percentage of reported participant backgrounds for each individual project.

PARTICIPANTS' REPORTED BACKGROUNDS (As Percent of Total for Each Project)

Background:	Percent:
Public Policy Forum:	
Administrator	21.7%
Public safety employee	12.2%
Training coordinator	8.1%
Health professional	6.8%
Educator	5.4%
State administrator	5.4%
Public sector employee	4.1%
"Right-to-Know" coordinator	4.1%
Other (inc., elected official)	32.2%
Total	100.0%
Health Net:	
"The European Working Party on High Blood Pressure in the Elderly"	
Registered nurse	44.7%
Physician	21.1%
Nurse practitioner	7.9%
Physician assistant	5.3%
Other (inc., Social worker)	21.1%
Total	100.0%
"Chronic Osteomyelitis"	
Registered nurse	52.6%
Physician	31.6%
LPN	5.3%
Other (inc., Physician assistant)	10.6%
Total	100.0%

Continued on next page

PARTICIPANTS' REPORTED BACKGROUNDS (As percent of Total for Each Project)

Background:	Percent:
AIDS Education Series:	
"Confronting AIDS on the Campus"	
Registered nurse	23.6%
College administrator	22.2%
Residence director	9.7%
Student	8.3%
Director of health services	6.9%
Social worker	5.6%
Other (inc., professor, counselor)	23.7%
Total	100.0%
"Teaching AIDS in High School"	
High School teacher	45.0%
Registered nurse	29.2%
Administrator	9.2%
Counselor	6.5%
Health care staff	5.0%
Other (inc., student teacher)	5.1%
Total	100.0%
Invisible Experiences:	
Professional working with the Deaf	37.5%
Deaf professional	22.5%
Parent	17.5%
American Sign Language student	17.5%
Other (inc., Deaf college student)	5.0%
Total	100.0%
Physics Forum:	
High school physics teacher	15.6%
High school computer science teacher	6.3%
High school teacher (other than above)	12.6%
High school teacher of more than one subject (science related)	36.0%
Computer coordinator	9.4%
Other (inc., College professor)	20.1%
Total	100.0%

In order to assist in planning future telecommunications projects, we asked participants to tell us from which receive site they viewed the teleconference demonstration projects. A complete aggregation of the frequency of responding participants at each site appears in the table below. Also included in the table are data on: the number of participants at each site as a percent of the total number of participants in a specific geographic area; the number of participants at each site as a percent of the total number of project participants; and the number of participants in each specific geographic area as a percent of the total number of project participants. The tabulation follows.

AGGREGATE PERCENTAGE OF PARTICIPANTS AT EACH SITE

Area Site/Event (City)	Number of Responding Participants: At Each Site	As a Percent of Area Total	As a Percent of All Participants
Greater Boston:			
Harvard University/Public Policy Forum (Cambridge)	52	23.5%	9.8%
Watertown Public Library/Health Net (Watertown)	16	7.2%	3.0%
Manet Comm. Health Ctr./Health Net (Quincy)	11	5.0%	2.1%
University of Massachusetts/AIDS Educ. Series (Boston)	131	59.3%	24.6%
Bunker Hill Com. Col./Invisible Experiences (Boston)	11	5.0%	2.1%
Total	221	100.0%	41.6%

AGGREGATE PERCENTAGE OF PARTICIPANTS AT EACH SITE, Continued

Area Site/Event (City)	Number of Responding Participants: At Each Site	As a Percent of Area Total	As a Percent of All Participants
North Shore:			
North Shore Comm. Hlth. Ctr./ Health Net (Peabody)	5	5.4%	.94%
Gtr. Lawrence Family Hlth. Ctr./Health Net (Lawrence)	21	22.8%	4.0%
Northern Essex Com. Col./AIDS Edu. Ser. & Inv. Exp. (Haverhill)	24	26.1%	4.5%
Univ. of Lowell/AIDS Education Series (Lowell)	42	45.7%	7.9%
Total	92	100.0%	17.3%
South Shore:			
Southeastern Mass. Univ./AIDS Educ. Ser. & Inv. Exp. (N. Dartmouth)	64	100.0%	12.0%
Total	64	100.0%	12.0%
Central Massachusetts:			
Worcester Polytechnic Institute/ AIDS Educ. Series (Worcester)	4	5.6%	.75%
Wachusett Regional High School/AIDS Educ. Series (Holden)	41	56.9%	7.7%
Mount Wachusett Com. Col./AIDS Educ. Series (Gardner)	17	23.6%	3.2%
South High Com. School/Inv. Experiences (Worcester)	10	13.9%	1.9%
Total	72	100.0%	13.6%

AGGREGATE PERCENTAGE OF PARTICIPANTS AT EACH SITE, Continued

Area	Site/Event (City)	Number of Responding Participants: At Each Site	As a Percent of Area Total	As a Percent of All Participants
Western Massachusetts:				
	Springfield Tech. Com. Col./Public Pol. For. & Inv. Exp. (Springfld)	42	50.6%	7.9%
	Brightwood-Riverview Hlth. Ctr./Health Net (Springfield)	5	6.0%	.94%
	Western New England College/AIDS Educ. Series (Springfield)	14	16.9%	2.6%
	Berkshire Community College/AIDS Educ. Series (Pittsfield)	22	26.5%	4.1%
	Total	83	100.0%	15.6%
	Total for all projects:	532		100.0%

We also wanted to know from where the Physics Forum users accessed the system, how, and about how often. Almost 48 percent of the Forum users access the system at their home, 28.6 percent access from their school, while most of the remainder access from either their home or their school. Users access the Forum via three "access lines"; one of the lines is an "800" line, one is an area code "413" number, and the other is an area code "617" number. Almost 80 percent of the Forum users stated that they usually use the "800" line. Almost 30 percent of the responding users stated that they utilize the system at least once a week. Another 31.7 percent stated that they utilize the Forum two or three times a month.

We asked participants in two demonstration projects to tell us if their attendence in the teleconferences had provided them with any ideas for the use of telecommunications in their own workplace, and in which specific ways

they thought telecommunications might be applied.

Almost half of the participants in the Public Policy Forum felt that telecommunications could be applied in their workplace; an additional 36.8 percent felt that telecommunications might be able to play a role in their workplace. The use of telecommunications to provide "workshops on policy issues" was cited by 62.8 percent of the respondents as a potential application of telecommunications in their workplace; 59.3 percent cited the use of telecommunications for "briefings about new regulations or developments"; 50.0 percent of the respondents felt that using telecommunications as a means of providing "skills training workshops" would be valuable; and the role of telecommunications as a mechanism for "data exchange with other regions" was cited by 47.7 percent of the responding participants.

Almost one-fourth of all responding participants in the AIDS Education Series stated that telecommunications could play a role in their workplace. An additional 50.0 percent from the first event, and 43.2 percent from the second, stated that telecommunications might play a potential role in their workplace. "Workshops on educational issues" was cited by 93.2 percent of the respondents from the first event of the series, and 78.5 percent from the second, as a potential application for the medium in their workplace. This was followed by "communication with colleagues from around the state" which was cited by 59.3 percent of the respondents in the first event, and 54.7 percent in the second. Almost 58 percent from the first event, and 42.7 percent from the second commented that the use of telecommunications to provide "workshops about policy issues" might be useful in their workplace.

Ancillary Services Needed for an Educational Application of Telecommunications

The Services Provided by MCET

The services that MCET provides for TAP demonstration projects include: a variety of consulting services (e.g., production, design, and cost determination); technical assistance for program development, production and transmission; and brokering for telecommunications capacity, production facilities, and receive site locations. Supervision of project implementation as well as receive site coordination, including the training of site coordinators, are also among the services that MCET provides. In addition, project transmission costs are partially subsidized by MCET. We wanted to know from the co-producers of each project if these services were effective, and how these services might be improved.

We found that the services MCET provided were held in high regard by the co-producers of each project. MCET's role in preparing those involved with the demonstration events, and providing technical support prior to, and during the video-based telecommunications events was seen as being very effective. Comments and suggestions regarding these services are cited below.

The co-producers for the Public Policy Forum felt positive regarding the services that they received from MCET. Their comments follow.

Dr. Bittel, Public Policy Forum

> "We were very pleased with MCET's role in preparing us for the project and assisting us during the actual events. MCET was always supportive in answering any questions that arose, and helped IGS seek out potential questions and information regarding telecommunications. The only real problem that has since occured is in using the videotapes of the event. We could have perhaps used more assistance on how to edit the video from the two sites for each teleconference to make one complete video of each event."

Dr. Eve, Public Policy Forum

> "The technical support that we received from MCET was first rate. For us to have had to figure out the technical pieces of telecommunications would have been impossible."

Dr. Rife, Public Policy Forum

> "MCET did a good job. I think they made the pilot project as effective as they could. They kept the production end in-line, camera and sound crew, etc. And, they responded quickly to any difficulties that did arise...."

Ms. Dwyer, co-producer of the Health Net telecourse series replied that she could not think of any services provided by MCET that needed to be improved. She did support, however, MCET's suggestion for having trained site coordinators at each receive site during the next Health Net series.

Ms. Dwyer, Health Net

> "MCET was absolutely invaluable. I can't really think of anything for them to improve upon. They did mention, however, that for the next series there would be trained site coordinators at each of the receive sites to set up the audioconferencing equipment and to be on hand for troubleshooting, I think this will be a valuable addition."

We asked Ms. Beebe, co-producer of the AIDS Education Series, how she felt about the services provided by MCET. She responded very favorably regarding these services, and the job that the MCET staff performed. Ms. Beebe's only criticism was that perhaps MCET should have been a little more "forceful" in getting her to choose receive sites for the second event in a more timely manner. Her complete response follows.

Ms. Beebe, AIDS Education Series

> "Generally, MCET was great. The staff certainly bent over backwards to make it work. The major problem that we had was locating receive sites (especially for the second event). But, I think that it was our problem, since we were so rushed. For me this was okay-- others might have been more frustrated with it. It was hard to look for sites for the second teleconference, when we probably should have, because the first event had not happened yet. Perhaps MCET should be more 'forceful' and say, 'Look, you are going to need more time to get receive sites'. The staff

would tell me that we should be getting these sites, but I would say that I could not deal with it yet.... Everything worked out okay in the end....

"MCET did a great job in preparing us in general though. The staff gave us great advise on things that we should be doing...."

The co-producers of Invisible Experiences were very positive about the services that MCET provided. Their comments follow.

Ms. Wilson, Invisible Experiences

"MCET gave us excellent assistance and support. They helped us through things that we never would have even thought about. MCET was our guide through the whole process, they helped us open up the communication link and understand what was to be involved. I can't think of anything that they could have improved on. If it were not for MCET we would not have been able to put on the event. Different people keep hosting workshops and conferences on the same topic at different places, over and over again. But we were able to offer it all at once because of MCET's capabilities and support.

"Our next goal is to go national! Hearing people have information at their fingertips available to them everyday of their lives (through radio, TV)-- we, the Deaf, do not.... Hearing people must realize that we are equals, that we can be educated and professional, that we deserve equality.... Really, I just want to thank MCET for making this happen."

Dr. Hoffmeister, Invisible Experiences

"MCET's services were very effective. The staff did their job very well, they were great in assisting us anyway that they could. I'm not sure what could have been improved-- MCET did a terrific job."

MCET trained project receive site coordinators to act as liason between MCET and the respective receive sites; to operate the audioconferencing equipment; to assist MCET with troubleshooting during the telecommunications events; and to represent the producers at the respective receive sites. We felt that it would be important to include the opinions of the receive site coordinators about their experiences.

We first asked receive site coordinators to tell us what they had learned from their experience that they found to be particularly interesting. Among the points they cited were: the use of telecommunications; the interaction and involvement of the participants; and the various issues presented in the projects. Their responses follow.

Ms. Pat Mirisola, Health Net

> "Being a site coordinator wasn't as complicated as I initially thought it would be. I figured that I'd also be very nervous, but once I got the equipment set up and everything worked, I was fine. People sometimes feel very lost in the electronic age, but with everyone on the audioconference, plus the MCET staff there for support, it was quite a comfortable and exciting experience.... We as a health center often feel isolated because we're the only center in the area. The use of telecommunications made the whole series extremely worthwhile because it allowed us to participate with other centers."

Ms. Susan O'Hara, Health Net

> "The interaction between all the sites and the panels was exciting. It was great to get the ideas and thoughts from all the health care sites, and for the health care sites to receive the same information all at the same time. It was also good to get our own staff together to view the shows."

Ms. Sandy Hubbarb, Health Net

> "The use of teleconferencing is very effective. Its a good method of learning. Great to have all the sites have input."

Ms. Andy Lineweaver, AIDS Education Series

> "I'm very much into technology in general-- and this experience with a new technological medium was great! I really liked the way that the equipment set-up. It was so straight forward and incredibly easy. We had no problems-- great audioconferencing and reception. The presentations went very well. The audience seemed to really be into it."

Mr. Don O'Dell, AIDS Education Series

> "I was very impressed with the minimal amount of equipment that was needed for the teleconference, and, how easy it was to set-up and operate. Also, I think the medium is just wonderful! It's

interesting, and allows people to participate without having to travel. I got the sense that people at the site thought the event was very exciting and enjoyed communicating with others from around the state."

Ms. Juliet Singer, Invisible Experiences

"I've coordinated conferences before, but because of the nature of the conference (i.e., an all Deaf panel) combined with the use of telecommunications, I found the whole thing very interesting."

We also wanted to know if the receive site coordinators were comfortable with their roles or positions in the telecommunications events. Their responses were affirmative.

Ms. O'Hara, Health Net

"Yes, definitely. I enjoyed it a lot."

Ms. Kathy Walsh, Health Net

"I was uncomfortable with the medium at first, but after I set up the equipment for the first event, I was fine. I did not have any trouble setting up the audioconferencing equipment."

Ms. Lineweaver, AIDS Education Series

"Yes, I was nervous, though, before I actually started to set up the equipment the day of the event. It helped a lot knowing that the MCET staff was available for troubleshooting and support."

Ms. Singer, Invisible Experiences

"I was a little nervous at first with the audioconferencing equipment, but that passed...."

Ms. Darlene Kemp, Invisible Experiences

"Yes, up to a point I was comfortable, but when we started to have minor technical difficulties I did not know what to do. I also felt that people expected me to know how to fix it, so that was a little uncomfortable. The technical staff at the site was very helpful, but they could not figure out the problem either."

Site coordinators were also asked if they felt that their experiences in the projects had been worthwhile. Their responses were positive.

Ms. Mirisola, Health Net

> "Definitely, the availability for programing in the Health Centers that the medium makes is wonderful."

Ms. Walsh, Health Net

> "Oh, yes, very! I enjoyed both the series and my role. Everything went without a hitch."

Ms. Lineweaver, AIDS Education Series

> "Oh, yes. I want to know when we're going to do it again! I get a lot of calls from De-tox centers all over the state for speaking engagements. But I just keep thinking, 'why should I travel?' We could use teleconferencing and reach a lot more people without having to travel."

Ms. Susan Thomas, AIDS Education Series

> "Yes, I'd like to do it again, given the right conditions."

Ms. Singer, Invisible Experiences

> "Absolutely! So did the people at the site."

We wanted the opinion of the site coordinators as to what they felt worked particularly well during the events. Among other things, they cited the help of the technical staff, the information presented in the teleconference events, and the ability to ask questions and make comments.

Ms. O'Hara, Health Net

> "The technology worked well for the most part. I think just being able to receive the information that we did, without having to leave the center was great. Plus, knowing that other health centers were receiving the information too."

Ms. Walsh, Health Net

> "I think that the actual participation by all of the different health centers across the state was wonderful. Hearing their questions and responses was very exciting."

Ms. Hubbard, Health Net

> "...I just want to add my thanks to everyone involved for allowing us to view the series. We appreciate being involved. In the future I would like to see more and more continuing education programs like the Health Net series. Its very convenient for people not to have to travel all over the state to participate in such events...."

Ms. Lineweaver, AIDS Education Series

> "We viewed the event in a large 'teleconference' room. We had five large television monitors, a great sound system, plus the room was wired for any kind of electrical use necessary. So, it was an ideal location...."

Mr. O'Dell, AIDS Education Series

> "The technical crew at my site were excellent. They were always present, and right on top of things. They patched the audioconferencing equipment through the public address (PA) system, this worked very well. There were very few technical problems, none that were real noticeble. The crew quickly took care of anything that did arise."

Ms. Singer, Invisible Experiences

> "The morning session went the best; I enjoyed it immensely, it was extremely interesting.... The technical crew helping us was great! No problems developed. All the equipment worked fine."

Ms. Kemp, Invisible Experiences

> "...the coordination between the entire group (the staff and the participants) was just wonderful. For example, we had all of our questions all ready before the start of the second telecast. When we arrived the technical person was there ready to assist us in any way. So, we got the room prepared, etc."

A meeting is held prior to teleconference events in order to familiarize site coordinators with the equipment that they will be using and the specifics of their role. We wanted to know if these meetings were effective; responses were positive.

Ms. Mirisola, Health Net

"Yes, becoming familiar with the equipment and getting an idea of how the series was to run was very useful."

Ms. O'Hara, Health Net

"Yes, it gave me plenty of information. I had no problem at all setting up the equipment."

Ms. Lineweaver, AIDS Education Series

"Yes, it explained things very well, although in the abstract. I must admit that I was a bit of a wreck before the teleconference. But, then when I got to the site, I reviewed my notes, looked around the room-- and once I started to set things up I found that it was all so incredibly easy. I didn't feel at all intimidated by the technology after that-- anybody could do it! Even if I could not have attended the meeting, I think that all I would have had to do was look at the materials that were handed out and figured it out from them."

Ms. Singer, Invisible Experiences

"Yes, it was very helpful as far as the technical preparation for using the audioconferencing equipment."

Ms. Kemp, Invisible Experiences

"MCET did a good job, there was no problem with the steps of how to set up the equipment-- it was all very clear. I did not have any trouble setting up the equipment. Although, I could not figure out what was wrong with the audioconferencing monitor, I do not know what to suggest in order to solve such problems in the future."

Additional Services Suggested by the Co-Producers

MCET currently uses existing telecommunications capacity for demonstration projects, thus restricting such projects to the limitations of this existing capacity. We wanted to know from the project co-producers how they would change their use of the medium if such restrictions did not exist.

The main points raised by the co-producers of the Public Policy Forum included: more sites, and the use of teleconferencing with other training

techniques. Their comments follow.

Dr. Bittel, Public Policy Forum

> "More sites, so that a greater number of people could participate. It would also be useful to integrate the broadcasts, so that one videotape of the event would result."

Dr. Eve, Public Policy Forum

> "We focussed primarily on two-way video and audio teleconferencing, I'm interested in other ways that we can use telecommunications to enhance our training programs. For example, the use of one-way video with multiple audio interaction on a specific subject. Face-to-face teleconferencing is limiting right now, it would be nice to use other techniques with it...."

Ms. Dwyer responded that she would like to see MCET establish a permanent link for transmission so that there would be uniformity in the use of the telecommunications medium.

Ms. Dwyer, Health Net

> "I would like to avoid the microwave link of Boston Catholic television if possible. Between transmission problems and having to deal with so many different entities in order to televise the series, it became quite a hassle at times. It would be great for MCET to establish a permanent link between the headends. There should be a uniform way of getting programs televised instead of all the different ways that we had to use."

The co-producer of the AIDS Education Series, Ms. Beebe, responded that they had not been concerned with any technical limitations, and probably the only thing that she would have done differently would have been to have an audience at the origination site. As she states below.

Ms. Beebe, AIDS Education Series

> "I don't think we were concerned about possible restrictions. For us it was just important that MCET was there for the technological aspects, and to help us cover the costs.... I think if I would have had an ideal situation about the only thing I might change would be to have an audience in the television studio at the origination site.... It can be hard for panelists not to have an audience in front of them."

Ms. Wilson, would like to see more active and ongoing involvement by MCET in Deaf media programming. At the next teleconference for the Deaf, Dr. Hoffmeister would like to see two-way video from one receive site to the origination site, so that Deaf participants could communicate directly with the panel.

Ms. Wilson, Invisible Experiences

> "I would like to have MCET advocate (on behalf of the Deaf) for valuable positions and cable capability so that the Deaf could benefit as equals in this world. We could have on-going shows on Deaf rights, Deaf consumer needs, sponsor national, state and local debates, educational programming, soap operas, sports, etc. Basically, everything that hearing people can get by just turning on the radio or the television set. Deaf people need and want all these things too. We need real connections, real cultural relations, on the local, state, national and even world level...."

Dr. Hoffmeister, Invisible Experiences

> "If we were to do it again (especially under 'ideal' circumstances) I would like to have one or two receive sites where Deaf participants, via a two-way video set-up, could communicate to the panel directly...."

Participant Comments and Suggestions About Telecommunications

We asked participants to comment on the telecommunications projects and/or suggest possible improvements. Many positive comments about the projects were made by participants. Participant comments and suggestions regarding the general program of the events will appear in Part Two of this report. A partial listing of comments and suggestions referring to the application of telecommunications and the technical details of the projects appears below.

General comments about future applications of telecommunications included:

"Keep up the good work! Hopefully we can do it nationally!"

"Have them more often, and expand across statelines and eventually nationally."

"Expand it and cover different topics, such as specific areas of education and other areas of social concern."

"Provide more of this process for many more things."

"Like telecommunications idea-- continue it! It allows expert speakers and sources to be shown on a relatively intimate basis with many people participating."

"Excellent possibilities!"

"I think it is a great way to have a lot of people see a conference without a lot of expense and travelling, and still get view points from all over the state."

"Excellent method for communication."

Comments and suggestions regarding the technical details included:

Public Policy Forum:

"Why couldn't audio be arranged so that questions could be made from seats-- interaction would be more spontaneous."

"Larger monitors in order to 'feel' greater presence of remote panel."

"When graphics are used have the speaker go to a board. Graphics will also have to be larger."

"More variation on camera angles and views."

Health Net:

"Charts and graphs were too small to read."

"Audiovisuals need to be larger for better viewing."

AIDS Education Series:[2]

"Had difficulty hearing questions from sites-- improvement in this area is needed."

"Improve quality of sound. Have questions asked (via audioconferencing) repeated for audience by host or person to whom question is addressed."

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2. Some receive sites for this project experienced audio and/or visual problems during transmission, due to unseasonably adverse weather. These sites were Western New England College (WNEC) and University of Massachusetts (U.MA) for the first event and Southeastern Massachusetts University (SMU), WNEC, Wachusett. Reg. High School (WRHS), Mount Wachusett Community College (MWCC), and U.MA for the second event.

"Provide a larger screen or a smaller room. Technical delivery improved, but was still difficult to hear. There should be permanent teleconference sites where such conferences are held!"

"Better seating comfort, better audio, better transmission."

"At our site there was a technical problem with viewing which became very annoying and distracting after a period of time. Other than that, the concept is terrific!"

"Great idea, but the AV equipment just didn't work well in Boston, plus we couldn't hear the questions and the screen had a lot of interference."

Invisible Experiences:

"Put a large screen on the stage."

Physics Forum:

"Have more lines into the Forum."

"More 800 lines."

"It is excellent and highly beneficial. Encourage and expand its use. Connect with other universities. Maintain 800 toll free number."

We asked users of the Physics Forum if they had found the Forum system easy to use. Over 66.0 percent of the respondents stated that the system was easy to use, another 30.6 percent answered that they found it "partially" easy to operate. Some comments were made by those respondents who reported finding the Physics Forum only "partially" easy to use; most of these comments referred to the user's lack of familiarity with the system. The only other repeated comment referred to the difficulty that some users have had with the menu system.

Comments included:

"I'm still in the novice stage."

"Not enough experience on system yet."

"It was easy once I knew the system."

"I feel the menu structure is not as simple as Applelink or Compuserve."

We also wanted to know if Physics Forum users had encountered any difficulties in accessing the system. When asked whether they had

encountered a busy signal when dialing the Forum telephone lines, 60.0 percent stated "seldom." When asked how often the telephone line has continued to ring (without being answered), 76.0 percent answered "seldom." Only one person stated that they had encountered either of these incidences "frequently," the remaining respondents replied that they had encountered these occurances "occasionally."

We asked Physics Forum users to tell us what additional support services they would like to see included in the system. Respondents stated that they would like to see workshops on such topics as: physics demonstrations; laboratory work; computer science; overcoming glitches in using the Physics Forum; navigation and tricks for speed in using computer programs; networking; telecommunications; computer interfacing; and math-related issues. When asked which specific computer networks they would like to see incorporated into the system, responses included: Common Ground; SCI-NET; anything related to biology; any education-based bulletin board system; and Dialog.

Suggestions Made By Receive Site Coordinators

We also wanted to know from the project receive site coordinators what were some of the problems, if any, that they had at their sites, or with the teleconferences in general, and what their suggestions for improvements would be. Included in their comments were observations regarding the length of some of the events, technical difficulties that occurred at some sites, and the preparation of the receive sites.

Ms. Mirisola, Health Net

> "We had virtually no on-site problems.... I had no problem hooking up the audioconferencing equipment and the picture was always good.... We all hope that the series continues, and that we're allowed to watch it next year!"

Ms. O'Hara, Health Net

> "We had problems with our phone until MCET staff came out and discovered what the difficulty was. Since it was in the phone itself, we used one in the room next door.... I definitely hope that a new series is offered. We just got into the habit of

watching the series regularly, and now its over. Maybe next year there can be more; perhaps a fall and a spring series...."

Ms. Lineweaver, AIDS Education Series

"Well, really the only problem was that there wasn't any food or coffee. I have to admit though that I didn't see anybody fall asleep! Everything really just went like a charm."

Ms. Thomas, AIDS Education Series

"I have very limited knowledge of the medium, but the weather was so bad out that day that I think that is why we had so much trouble. People became restless and stressful because they were sitting too long which made it even more difficult to view a screen which was really hazy, that had constant sports channel messages coming over it, and for them not to be able to hear the questions being asked over the audioconference.... The conference itself should have been formated with a break in the middle, and maybe even a few other short breaks. Also, really large rooms should be avoided. We were in a gym, which was completely unconducive to a comfortable, interactive environment."

Ms. Singer, Invisible Experiences

"The event was too long, especially the afternoon session. People got a little restless.... People got restless having to wait so long for their turn to ask questions, so maybe next time the moderator should just have one or two panelists answer each question.

"A couple minor logistic problems developed. The principal at the school knew that we were using the site for the teleconference, but the rest of the staff did not. This was a little uncomfortable, since there were a lot of people coming to the site, and 'invading' their work area.... Also, the room that we were in had large windows in it, this caused some glare on the television screen."

Ms. Kemp, Invisible Experiences

"The volume went 'up and down' during the question and answer period. One site coming over the audioconferecing system would be too loud, another would be too low-- we just could not get it adjusted properly. Also, regarding the preparation of the site, it would be good to have signs already made up for when we arrive...."

The Benefits Derived from the Educational Application of Telecommunications

Project Goals

We wanted to know from the co-producers how successful the demonstration projects were in meeting their original goals. Overall, the co-producers felt very positive about the projects. Their goals were for the most part successfully reached. There were, however, a few exceptions. These are discussed below.

In general, the co-producers of the Public Policy Forum felt very positive about the project. They viewed the events as being successful as a learning experience and as a demonstration project.

Dr. Bittel, Public Policy Forum

> "Everything about the teleconferences was positive. We received very positive feedback on the events. Our main goal, however, that of 'how to use teleconferencing,' is still not resolved. Because of the expense involved it's tough to work it in on a per capita cost as IGS usually does."

Dr. Eve, Public Policy Forum

> "As a pilot demonstration project is was highly successful. Our goal in the project was to find out what we could learn about teleconferencing, and to get ideas on how IGS could use it as a new technology for training. To the extent that the events were successful as a final product, that is as a means of information exchange on the issues that we presented in the project, is secondary. Although no specific use of the medium is being proposed right now, the project presented IGS with various ideas for the use of telecommunications."

Dr. Rife, Public Policy Forum

> "My goals in participating in the project were from the communications angle-- and yes, it was successful as a pilot project. I think that people got their information, and I think that they learned more about the topics presented.... What is achieved through a telecommunications event, that is not achieved in a conventional, in-person conference, is the convenience of people not having to travel very far. Ideally more people can participate, with more face-to-face interaction because of the

small group atmosphere in the studio connecting everyone to the larger group...."

As reported below, Ms. Dwyer, viewed the telecourses as being highly successful in meeting both of AHEC's goals for the Health Net series.

Ms. Dwyer, Health Net

> "We had two main goals. Our first goal was to provide continuing education programming for health center staff. We had been doing this but with the use of teleconferencing we were able to get more of an interactive format. Our second goal was to expand our existing network throughout the state. Both of these goals were very successfully reached through the use of teleconferencing."

When we asked Ms. Beebe to tell us whether her original goals for the AIDS Education Series were successfully achieved, her overall response was positive. The first event, "Confronting AIDS on Campus," in particular was viewed by Ms. Beebe as being highly successful. DPH has had many requests for the videotape of the event, and many inquiries into AIDS Awareness Week. However, because of the technical difficulties that occurred during the second event, "Teaching AIDS in High School," she viewed it as being somewhat less successful. Her comments follow.

Ms. Beebe, AIDS Education Series

> "We had two main goals for the 'Teaching AIDS on the Campus' teleconference.... Our first main goal was to get people (administrators, educators, and college health professonals), to start thinking about the policies that they might need to adopt in the very near future.... Our second goal was to get them to think about AIDS education. Specifically we were promoting AIDS Awareness Week (this fall), but also in general to give participants ideas on how to prepare their own AIDS curriculum.
>
> "Yes, the teleconference was very successful. We have received a lot of requests by people who were participants at the event, who would like to show the video at their campus. We have also had many calls by people who were unable to participate, but would like to view the videotape. In addition, a number of people have made inquiries about AIDS Awareness Week; this is exciting because other than the teleconference we have not promoted this much....

"For the 'Teaching AIDS in High School' teleconference we had different goals. Our initial goal was going to be to teach participants the 'Teaching AIDS in High School' curriculum, but their were some problems, and it wasn't quite ready in time. So, instead we decided to lay the ground work for the curriculum package, so that when the curriculum became available (it has since been made available), it would not be a new concept to them....

"Yes, it terms of content the teleconference was successful. The technical difficulties that we had were a disappointment and certainly detracted from the overall success of the event. We also should have provided some refreshments, and maybe more break time, etc. for greater comfort of the participants.... It was good that we had the health educators at each site. It was a way of supplementing the teleconference with a more 'human element.'..."

Below, Ms. Wilson cites the various ways in which Invisible Experiences was highly successful in meeting DMC's objectives for the project. Dr. Hoffmeister also stated that the Center's two main goals were successfully reached. He did, however, express that the application of one-way video was not entirely effective for enabling Deaf people to directly interact with the panel.

Ms. Wilson, Invisible Experiences

"I asked various groups in the Deaf community, specifically the WGBH Caption Center, the Massachusetts State Association of the Deaf, the Massachusetts Commission for the Deaf and Hard of Hearing, Boston University, and Northeastern University to get together last year. We had two meetings and came up with twelve goals that we needed to work toward in the community. We, the Deaf Media Coalition (DMC), put a lot of thought into all the discussion and feedback we had received from these meetings. We narrowed down our goal to one, a focus on parents....

"We decided that we would have a Deaf panel with various educational, social and professional backgrounds. This criteria was measured against what we felt parents needed. That is, helping them understand and overcome the language barrier between the Deaf and the hearing world, and to explain to them the Deaf education barrier that we (Deaf people) have all encountered. We wanted an event that would 'wake' parents up and make them aware of the better educational opportunities available for the Deaf and how important these are to us and their children. In otherwords, create an opportunity for consciousness-raising....

"Yes, the teleconference was very successful! It helped us as Deaf people to organize the event and to maintain our sense of dignity by recapturing our identity in a medium that's very powerful. For us to be able to take pride in our work is a very exciting venture; we could with the all Deaf panel. Often, with hearing people we have to accept their view of the world. It is nice to have many genuine Deaf role models to perpetuate our real identity.... Its very important for Deaf people to work with professionals, parents, and others in the community as equals, without a cultural bias."

Dr. Hoffmeister, Invisible Experiences

"Our main goal was to produce a program that would demonstrate to parents and professionals the range of backgrounds of Deaf people and how these Deaf people feel about various educational programs, alternatives, opportunities, etc. Yes, in these terms it was very successful. We also just wanted to see if we could use the technology for such conferences-- and yes, we discovered that we could. In terms of it being a teleconference whereby Deaf people could interact directly with a panel, however, it was less successful. This occurred because of a couple reasons. First, not enough people were able to participate in the event largely because we are restricted to offering the teleconference on a weekday. Also, the length of the event was too long for some people to be able to attend.

"Audiocommunication is a problem in terms of Deafness, in general. The technology is currently not advanced and smooth enough yet. It would have been ideal to utilize a two-way video format. That is, have all the Deaf people at one or two sites, and utilizing two-way video allow them to communicate directly with the panel."

We also asked the director of the Physics Forum, Professor Sternheim, what the original goals for the project had been, and whether or not these goals had been met. He stated that the Physics Forum has been very successful in meeting its original goals.

Dr. Sternheim, Physics Forum

"When we first conceived the idea of the Forum in the fall of 1985 our goal was to get half to three quarters of the physics teachers in the state to use it. But, by the spring of 1986, when the project actually started up, we (more realistically) sought a 'significant' number of teachers to use it. So, yes, the project is meeting our goals on this level. We realized that we could not just 'start' a Bulletin Board System-- outreach, training, and education needed to be incorporated from the

beginning. To people familiar with computers, a BBS would be easily understood and appreciated, but to science teachers such systems are foreign, we thus needed to be more outreach and educationally oriented.

"Our basic goal then was to first, accomodate physics teachers, and second to accommodate other science teachers and computer science teachers. This is working out very well. As we see what works well, and what else we can do, perhaps we will broaden this goal."

We also wanted to know from the project co-producers if they could have accomplished their educational objectives for the projects without using telecommunications. While some of the project co-producers felt that similar goals may have been reached without the use of telecommunications, the application of the medium allowed for other benefits not found in in-person learning formats.

The role of the Public Policy Forum in allowing the IGS staff to use and "experiment" with telecommunications was cited by the co-producers as one of the benefits gained in using teleconferencing. The application of telecommunications as a public service, as a public relations and marketing tool, and its advantages for organizational staff were also mentioned.

Dr. Bittel, Public Policy Forum

"...Public relations, marketing, and the role teleconferencing can play as a public service are all very important benefits derived from participating in the teleconference project. But it is difficult to place a money value on them. IGS will continue its offering of regular, in-person conferences and workshops, and would like to offer more telecommunications events, and probably will, but the issue right now is its expense. The marketplace currently is not used to paying for telecommunications, so that compounds the problem."

Dr. Eve, Public Policy Forum

"We could have achieved our content objectives, that of information dissemination, through the use of conventional formats. This was secondary in our goals, however. Our main goal was to test what we see as a promising new medium. It is difficult to place a value on this.... The costs for teleconferencing involve all the direct costs required for conventional conferences, plus the costs of the technology. While the costs are higher it doesn't matter because the real

value in using telecommunications is in learning more about the technology and how we can use it in the future."

Dr. Rife, Public Policy Forum

"I would think that in a lot of ways the two are similar, it depends on its purpose. With telecommunications the small group atmosphere at the studio is probably more conducive to audience participation and interaction. From an organizational stand point, there are clear advantages in terms of support staff. With less travel time involved, and therefore less staff time away from the office, using telecommunications is more efficient. Although teleconferencing is costly, I would rather see the expense go toward the technology, and have agency staff more available for other things."

Ms. Dwyer stated that the use of in-person conferencing formats would not have allowed AHEC to achieve its goals because their clientele is in need of educational programming provided via telecommunications. As she explains below.

Ms. Dwyer, Health Net

"No, we could not have accomplished our goals without using telecommunications. We are in the business of televising continuing education programs-- so the main cost is for transmission. Our clientele, area health centers (such as, neighborhood health clinics) do not have the resources to send their staff to in-person conferences or courses. Even if they did they would not have the release time for their staff. What we do then is to provide continuing education to health centers, at a convenience to them (at their site, and at a time fairly convenient for center staff), and at no cost to the receiving center.

"Although I don't know how to place a monetary value on such benefits, I feel that the incurred benefits to the participants are high."

Ms. Beebe stated that although the use of an in-person conference format would have cost DPH less money, she questions whether participants would have attended the AIDS Education Series if it would have been held in only one location.

Ms. Beebe, AIDS Education Series

> "It would have cost a lot less money because we can generally get someone to donate the space, etc. for such conferences. But the question is would people have come to a conference in one location. We took on a big expense with the transmission costs for the teleconferences, but ultimately we feel that by reaching so many people (in such an accessible way from their point of view) that it was a worthwhile expense."
>
> "If you look at the number of schools who were represented at the teleconferences, divide the cost of the transmission by this, it comes to about $50. per school to have participated. So, while we had to pay a lot more for the medium, the value was also great. No one in my department (including my boss and the commissioner) has said anything about the costs, they thought the project was great."

Ms. Wilson stated that she felt that the use teleconferencing was more economical and efficient than in-person formats. Dr. Hoffmeister, a co-producer for Invisible Experiences remarked that while they probably could have sponsored a few in-person conferences and produced similar results, the end result would have been different. They now know that the medium can be very useful in producing conferences for the Deaf.

Ms. Wilson, Invisible Experiences

> "I think that the teleconference was more economical in the long run than putting on workshops at different sites and at different times. While its often preferable to have the face to face communication that a conventional workshop or conference offers, the energy and time saved by the telecommunications medium is worth it. Plus, the added benefits that I have already mentioned."

Dr. Hoffmeister, Invisible Experiences

> "That depends. Yes, we could have held a few in-person conferences throughout the state and accomplished at least similar educational goals. And, I believe that this would have been less expensive. But it would not have produced the same end results. We now know that the medium can be very useful to us. We also produced a professional videotape of the event. We are in the process of editing this and we will be showing it to parents (of Deaf children and adults) in order to inform them, and to raise money to pay for the teleconference."

Other Benefits Associated with the Use of Telecommunications

We also wanted to know from the co-producers what was achieved through the use of telecommunications that could not have been otherwise achieved. Increased interaction between participants, reaching a wider audience, and less participant travel are among the benefits cited by project co-producers.

Ms. Dwyer pointed to the increased "interactive activity" between the sites that is available through using the audioconferencing mechanism as being something that AHEC had not achieved in its other telecommunications activities.

Ms. Dwyer, Health Net

> "The use of the audioconferencing medium was very good because it allowed us to get interactive activity that we had not achieved before. Prior to utilizing this technique we had broadcast similar events over public access television using a 'call-in' format. Audioconferencing made this aspect much simpler and more appealing to the participants."

Ms. Beebe stated that through the use of telecommunications they were able to present the AIDS Education Series to people located throughout the state and without participants having to travel very far. In addition, DPH only had to utilize one pool of speakers for each event.

Ms. Beebe, AIDS Education Series

> "There were two things that we felt we achieved through the use of teleconferencing. The first, and main thing was that we were able to reach a broad audience (from across the state) without them having to travel very far to participate. I don't know how many people would be willing to travel for conferences such as the ones we offered, espcially teachers. The second benefit was that we only had to draw upon one pool of speakers. On such short notice I don't think that that we could have gotten some of our speakers (e.g., Dr. Margaret Bridwell) to do two or more in-person conferences across the state."

Both co-producers for Invisible Experiences stated that the use of the medium allowed them to reach areas that they probably would not have otherwise been able to. Ms. Wilson also cited, among other things in her

detailed response that follows, that the medium allowed them to present the same information to all participants at the same time, something unusual in conferences for both the hearing and the Deaf.

Ms. Wilson, Invisible Experiences

> "I feel that every time our people go to different places to speak and educate others about Deafness in the true sense of the word, we realize that we do not have enough qualified individuals to say the right things that apply to our experience. So we decided to use telecommunications as a medium to radiate out to many people at once-- in order to reach a very large audience with our information. People are often afraid to come to a large Deaf event, so we felt it would be easier to get people at remote sites with smaller audiences. Transportation is often a problem, especially longer distances. Also, people feel more comfortable with others from the same area. Telecommunications made this possible, plus allowed us to be visible not only in one local area, but across the state.... Using telecommunications saved us a lot of energy and time that we would have spent setting up in-person conferences across the state. Plus, everyone watching got to see the same signs (i.e., ASL), and receive the same information all at the same time....
>
> "Hearing people, and especially hearing parents of Deaf children need to see our qualities and qualifications. Through the teleconference they got the information directly from the Deaf presenters...."

Dr. Hoffmeister, Invisible Experiences

> "We got information to more different areas (of the state) than we probably would have been able to using an in-person conference format."

Special Considerations for the Application of Telecommunications

The project co-producers were asked to explain what they found to be the primary differences between producing a telecommunications event and producing an in-person workshop or conference. As evidenced by the comments made by co-producers, the demonstration projects varied significantly in their planning requirements. For example, the co-producers of the AIDS Education Series had to locate and staff receive sites, while the co-producers of Health Net provided programming to participants at their work sites.

Focussing on two sites instead of one, and being able to invite fewer people to such events are included in the comments by the co-producers of the Public Policy Forum. It should once again be pointed out to readers that this project utilized two-way interactive video, thus presenting special differences in the application of the medium, not found in the other projects.

Dr. Bittel, Public Policy Forum

> "For IGS the primary difference was in the number of people we could invite to the teleconferences. IGS rarely conducts workshops or conferences for fewer than two hundred (200) people. Moreover, IGS tries to get 'important' and well-known speakers for its conferences, who in general expect a large audience. The problem that IGS ran into with teleconferencing was first, whom to invite, and second, how to appease the panelists so that they felt comfortable with this smaller audience. The latter of these was solved (with no negative feedback from panelists) through the idea of using a video of the teleconference as a marketing/training tool by IGS. The former, however, was never fully resolved. IGS used two different methods for choosing participants in each of the teleconference events, neither proved totally comfortable to IGS staff, however.
>
> "It proved slightly problematic for the IGS staff to explain to people what was going to happen with the telecommunication process. Some questions and confusion developed among participants in terms of what was going to transpire during the teleconference, and what site they (as participants) should plan on going to."
>
> "I think we received excellent public relations. Just 'doing it' probably allowed for this since we were the first ones to participate in a complex two-way video event.... Recently an article has been published in our newsletter on the two events and we will use the video as a promotional/training tool."

Dr. Eve, Public Policy Forum

> "When IGS sponsors a conventional conference, our focus is on those who will attend at the (one) site. Therefore, one of the main differences in sponsoring a telecommunications event is having to focus on two sites. The panel in the first teleconference tended to focus primarily on the TV monitors, and therefore 'lost' some of the in-house audience. Although not totally resolved, this was pointed out to the panel for the second event, and the situation improved.

"Outreach to our clients was done on a dual basis for the project. We focussed on both the content of the events, and the training process (the telecommunications medium). IGS usually justs concerns itself with the content, and the client base that would be interested in that content. With this project, however, we tried to bring in a broader clientele. People that we felt would not only be interested in the issues, but also in the technology."

"Usually, with conferences sponsored by IGS we get a lot of press, or no press, depending on the issues, and who is presenting them. Press is very difficult to get, and is therefore generally secondary to our goals. We did get some press coverage at the Springfield site. The public relations achieved just by using telecommunications however, is good."

Dr. Rife, Public Policy Forum

"It seems that in producing a teleconference you need to pay even closer attention to all the details that go into producing a conventional conference. Things like making sure that 'networking' can occur, creating a place for more interaction between the panel and participants, etc.

"I personally didn't find it much different. It was comfortable working with the medium, and very exciting. I was pleased to have been involved. It was a real plus for IGS to participate in teleconferencing. The ability to share communication across the state, and have everyone hearing the same thing at the same time is a great process, very open and democratic. The potential of teleconferencing as a valuable public relations tool for IGS is reflected in this."

Ms. Dwyer stated that AHEC required fewer staff to co-produce the Health Net telecourse series, than to produce similar in-person courses. In addition, she feels that the use of the technology made them more attractive to funding sources. Her remarks follow.

Ms. Dwyer, Health Net

"The telecourse format required fewer staff than similar in-person course formats. Especially in the way that we used the technology. We didn't have to book a room, worry about parking, getting refreshments, etc. People are a bit phobic about the medium still; the technology can be a little scary. But I think as the medium gets more popular this will pass.... I think that using teleconferencing made us more attractive to funding sources because its a new technology, and has the potential to reach more people than conventional workshops or courses."

Ms. Beebe felt that in some ways co-producing the AIDS Education Series was more difficult than producing in-person style conferences because of having to plan for the receive sites.

Ms. Beebe, AIDS Education Series

> "...With the exception of only having to locate one pool of speakers, I think that planning the teleconferences was harder, because it ended up like planning for five (or seven for the second event) conferences. Since we had all these receive sites we had to touch base with all of them. We needed to have staff...plus the on-site health educators, at each site. We also needed to figure out logistics, such as parking, for each site....
>
> "Publicity was about the same. We produced only one brochure. We promoted the medium as being an efficient way to disseminate information, it was very positive. There really wasn't any questions or confusion about what a teleconference was from the participants...."

The co-producers of Invisible Experiences were mixed in their thoughts about producing telecommunications events. Ms. Wilson stated that "...much of the basic preparation involved was about the same...," while Dr. Hoffmeister felt that "...more planning was involved."

Ms. Wilson, Invisible Experiences

> "I feel that the teleconference was very beneficial because being able to telecast to five different audiences simultaneously, people all over the state could feel a part of it. It is an extremely powerful medium. With workshops, there is just one audience, at one site, and in order to reach others you have to repeat and repeat it. Much of the basic preparation involved was about the same, except of course that their is only one site involved in a conventional workshop. Less people would come to an in-person conference, especially one in Boston (too much traffic). Thus, more people were able to participate in the teleconference.
>
> "It was a little difficult explaining to people working on the event, and others, exactly what would happen. I was always being asked, 'What is it?' 'I don't understand, will we see the audiences?' Some people would get frustrated, I just kept saying, 'Wait for the event and you'll see!' Then, the day of the show they saw-- now everyone is very proud that they were involved.

"The public relations went very well. We mailed out over 4000 fliers through the Massachusetts Parents Association for Deaf and Hard of Hearing Children, the Deaf Media Coalition, Boston University, and various schools. We also had an article and some advertising in the Deaf Community News...."

Dr. Hoffmeister, Invisible Experiences

"There is much more planning involved, more details to deal with (e.g., receive sites, technical aspects), and much more rehearsal time needed. Coordination between agencies is of greater importance and more time consuming. Although it took up more staff time, it was a very worthwhile and learning experience. There was basically no difference in outreach or publicity about the event. Also, everyone seemed comfortable with the technology."

The Participant Perspective

We also wanted to know the benefits of teleconferencing from the participants' point of view. We first asked them to rate the overall performance of the projects. An aggregate rating, which combines the overall project ratings given by all responding participants, appears in the table below.[3] The rating indicates that the TAP teleconference projects were very successful. Aggregated results show that 83.6 percent of the responding participants gave overall ratings to the projects of either "excellent" or "good." Summary overall ratings for each specific demonstration project will follow the aggregated data.

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3. Because of its unique nature, the Physics Forum is not included in any of the aggregated data.

OVERALL RATING OF THE TELECONFERENCE EVENTS AMONG ALL PARTICIPANTS

Rating:	Percent:
Excellent	28.8%
Good	54.8%
Fair	13.1%
Can't say	2.7%
Undecided	.6%
Total	100.0%

Participants in the Public Policy Forum felt very positive about the project. A full 90.7 percent of the respondents viewed the project as being either "excellent" or "good." Only a very small percentage viewed it as "fair," with one respondent giving it a rating of "poor."

Comments from the project's participants included:

"Excellent."

"It provided a variety of speakers which helped to keep the audience's attention."

"...Chance to hear about issues in Western part of state."

"An excellent job!"

"You are not stuck in the back of the room!"

"Very informative and educational."

Almost 90 percent of the participants in the first Health Net event, and 57.9 percent in the last, rated the events as being either "excellent" or "good." Almost all of the remaining rated the events "fair." The ratings were significantly lower for the last event due in part to minor technical difficulties occuring at two of the three sites that responded to our questionnaire. In addition, participants rated the program aspects of the

last event significantly lower than the first, possibly affecting the overall rating of the event.[4]

Participants in the AIDS Education Series felt overwhemingly positive about the events. Almost 80 percent from the first event and 81.6 percent from the second event rated the project either "excellent" or "good." Thus, despite the technical difficulties experienced by some of the receive sites, a clear majority of those attending the events nonetheless felt positive about their experience. This is especially significant in regard to the second event in which five of the seven receive sites were in some way affected by the adverse weather conditions.

Participant comments about their ratings of the project included:

"The reality of only driving twenty minutes for this makes it most worthwhile, despite whatever drawbacks..."

"Great mode of getting information across to many participants."

"Teleconferencing is a good idea for sharing, but the technical aspects need to be addressed."

When comparing the participants' overall ratings of the first event in the AIDS Educations Series to the receive sites at which they participated, we find, as would be expected, that the ratings by respondents at the sites without transmission interference were somewhat higher. Still, 54.3 percent of the respondents from one receive site that experienced transmission problems and 79.3 percent of those at the other site experiencing such difficulties, rated the event either "excellent" or "good." When we look at the same comparison for the second event, the interference experienced at the affected sites was judged to be more significant. From 2.5 percent to 6.3 percent of the respondents at the affected sites rated the events as "poor." Significantly, however, at least 70.0 percent of the participants rated the events either "excellent" or "good." In addition, the two sites that were

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4. At the Lawrence site MCET had attempted to videotape the telecourse setting. However, the equipment necessary to do so interferred with the reception at the site. The cable company responsible for transmission to the Quincy site failed to transmit the first part of the event.

not affected by the interference rated the event very highly, with 95.5 percent for the one site, and 100.0 percent for the other, rating the events as either "excellent" or "good."

Invisible Experiences was extremely popular with virtually all of the responding participants. Over 45 percent of the respondents rated the event as being "excellent," while another 50.0 percent rated it as "good." When comparing the participants' reported backgrounds with their overall ratings of Invisible Experiences, some interesting results occur. We find that while 75.0 percent of the Deaf professionals rated the event as "excellent," only 33.3 percent of the responding parents rated it as "excellent." In reviewing the comments made by parents three issues surfaced that possibly point to the reason behind the lower parental rating. Two parent-participants referred to the length of the event-- that it was too long, especially the break, and that it started too late, and another referred to the question and answer session-- that there should be room for follow-up questions. The last comment stated that the program itself should have provided more information regarding oral communication.

We also asked participants to rate various aspects of the demonstration projects. An aggregate of participant responses shows that all categories received a rating of "satisfactory" or better from at least 85.7 percent of the respondents. The complete distribution is presented below. Following the aggregate data chart is a summary of the specific project findings for this question.

PARTICIPANTS' RATINGS OF THE FOLLOWING ASPECTS OF THE TELECONFERENCES

	Excellent	Good	Satisfactory	Poor	Total
Program agenda	38.3%	50.7%	10.5%	.6%	100%
Use of telecommunications	20.8%	38.4%	26.5%	14.3%	100%
Allowing direct contact with panelists	27.8%	40.0%	21.0%	11.3%	100%
Not having to travel long distances to attend	51.1%	36.3%	9.9%	2.7%	100%
Interchange with others from across the state	21.3%	39.2%	27.6%	11.9%	100%
Varied perspectives of presenters	34.2%	46.2%	17.9%	1.7%	100%
Learning more about the issue presented	28.5%	48.9%	19.7%	2.9%	100%

At least 74.7 percent of the participants in the Public Policy Forum gave a rating of "excellent" or "good" for all aspects of the project. With only one exception, the project was given a "satisfactory" rating on any one element by about one-fifth (or less) of the participants, and a rating of "poor" by not more than three of the responding participants.

Health Net participants also rated the telecourses highly. Over 80 percent of the respondents rated the first telecourse as being either "excellent" or "good" in five of seven categories, with virtually all of the remaining participants rating the event as "satisfactory." For the last event in the telecourse series, the ratings were somewhat lower. Still, at least 80.0 percent of the responding participants gave the event a "satisfactory" or better rating in all categories.

Participants in the AIDS Education Series felt positive about the events. A majority of the participants rated various aspects of the events as being

either "excellent" or "good." The first event of the series received such high ratings from at least 77.9 percent of the responding participants in six out of eight categories. The second teleconference received such ratings from at least 78.6% of the respondents in half of the categories. Although ratings in the other categories were lower than respective ratings for the first event, it is significant that the event was still viewed so highly, given the technical difficulties experienced during the event.

At least 90.0 percent of the participants rated Invisible Experiences as either "excellent" or "good" in all categories but three. It is particularly noteworthy that such a high percentage (from 61.0% to 76.7%) of participants gave "excellent" ratings to: "interchange with others from across the state"; "allowing direct contact with panelists"; and "not having to travel long distances to attend." While only two aspects, "learning more about the issue presented," and "discussion with participants at your site," received ratings of "satisfactory" by a significant number of respondents.

Participant comments included:

"With the medium you can cover such a large group of people."

"The event was fun."

The majority of Deaf participants (87.5 percent of the Deaf professionals, and all of the other Deaf participants) in Invisible Experiences rated the event as being "excellent" in its aspect of "allowing direct contact with panelists." The remaining Deaf professionals gave a rating of "good" to the aspect. Although the vast majority of all respondents rated the event highly on this aspect, such a high rating by Deaf participants is revealing, in that it does not appear that they felt that the use of one-way video compromised their ability to communicate with the panelists.

We also asked some of the project participants to tell us what aspects of the teleconferences they found to be "particularly creative or appealing." Over 61 percent of participants in the Public Policy Forum cited "two-way video communication with the other site" as being particularly creative.

All aspects were cited by approximately half of the respondents in The AIDS

Education Series as being particularly creative or appealing. As one participant commented: "I've never been to a teleconference before, its fascinating and once the bugs get worked out it will be great."

A large majority of Health Net respondents, from 73.0 percent of the participants in the first telecourse to 83.3 percent in the second, found the "convenience" of telecommunications "in terms of travel and their work schedule," as being particularly appealing. The "use of teleconferencing as a means for delivery of instruction" was found to be particularly appealing by 86.5 percent of the participants in the first event and 50.0 percent in the second.

Participants were also asked to compare the effectiveness of the TAP demonstration projects with other in-person conferences or workshops they had attended in the past. An aggregate tabulation of all project participant responses to this question reveals that teleconferencing was viewed very favorably. At least 81.1 percent of the respondents felt that teleconferencng was either "more effective" than, or "about as effective" as, other in-person conferences that they had attended, in all but one category. A summary of the comparison ratings for each project appears after the aggregate data chart.

HOW EFFECTIVE WERE THE PROJECTS IN ACCOMPLISHING THE FOLLOWING COMPARED TO IN-PERSON CONFERENCES OR WORKSHOPS: RESPONSES FROM ALL PARTICIPANTS

	More Effective	About as Effective	Less Effective	Undecided	Total
Presentation of issue	22.6%	62.4%	13.8%	1.2%	100%
Bringing together people from across the state	55.7%	27.6%	14.3%	2.4%	100%
Ability to ask questions and have them answered	27.0%	42.5%	30.1%	.4%	100%
Panel presentations	39.1%	58.3%	2.6%	0.0%	100%
As a means of presenting the expressions of others	50.0%	50.0%	0.0%	0.0%	100%
Travel time efficiency	60.9%	30.8%	6.8%	1.5%	100%
Ability to meet educational needs	1.9%	79.2%	15.1%	3.8%	100%

When we asked Pubic Policy Forum participants to compare the project with other in-person conferences or workshops that they had attended in the past, teleconferencing was viewed in a very comparitive light. A clear majority of participants, at least 86.3 percent, felt that the teleconferencing format was either "more effective" than, or at least "as effective" as, in-person conferences they had attended. Almost 93 percent felt that the use of telecommunications was either "more effective" than, or "about as effective" as, other in-person conference formats in "presenting the issue."

Health Net respondents felt that the telecourses compared quite well to in-person classes they had attended. In all categories but one, at least 82.3 percent of the participants in the first event felt that it was either "more effective" than, or "about as effective" as, other in-person courses they had attended. As with the first event, a clear majority-- from 68.5

percent to 100.0 percent (for travel time efficiency), rated the last telecourse as being either "more effective" than, or "about as effective" as, other in-person classes they had attended.

Participants in the AIDS Education Series also felt that teleconferencing rated very comparatively, with at least 65.2 percent of the respondents who attended "Confronting AIDS on the Campus," rating it as being "more effective" than, or "as effective" as, in-person conferences they had attended. Over 80 percent of those in the first event felt teleconferencing was either "more effective" than, or "about as effective" as, other in-person formats in "bringing together people from across the state." "Teaching AIDS in High School" was judged as being "more effective" than, or "about as effective" as, other in-person events by at least 81.7 percent of the participants in two categories, with at least 57.0 percent feeling similarly about the other two elements. Again, "bringing together people from across the state" was given such comparison ratings by over 80 percent of the respondents.

Participant comments about the project's effectiveness included:

"Excellent."

"Its nice not to have to travel to Boston all the time!"

"More effective in terms of less time travel involved, and the number of topics and panelists in one place!"

"This was my first time at a teleconference. I feel that it will become a great tool in health education issues."

In all cases over 91.2 percent of the Invisible Experiences respondents rated the event as being either "more effective" than, or "about as effective" as, other in-person conferences they had attended. In three aspects, at least one-half of the respondents rated the teleconference as being "more effective." One significant finding is that 70.6 percent of the respondents thought that the teleconference was "more effective" than other in-person conferences they had attended in "bringing together people from across the state."

In comparing Invisible Experiences according to its effectiveness in allowing participants the "ability to ask questions and have them answered," it is noteworthy that 75.0 percent of the responding Deaf professionals rated it as being "more effective" than other conferences they had attended. One hundred percent of the professonals working with the Deaf felt that the teleconference was either "more effective" than, or "about as effective" as, in-person conferences on this aspect.

Participants were asked to tell us if they would have participated in the teleconference events if they had to travel long distances (specifically sixty miles further than they did to attend the events). This was obviously a very important issue to many participants, and one of the clear merits of telecommunications medium. From 48.2 percent of the participants in the Public Policy Forum to 77.8 percent of those participating in Health Net stated that they would not have been able to attend the events if they would have had to travel such distances. One possible implication in this is that teleconferencing can reach people that other in-person conference formats cannot.

As stated above, almost half of respondents who participated in the Public Policy Forum stated that if they had to travel sixty miles further than they did, they probably would not have attended.

We posed the question in two ways to participants in the Health Net telecourse series. We first asked participants if they would have attended the events if they would have had to travel to attend. Over 60 percent of those attending the first telecourse, and 77.8 percent of those attending the last event stated that they would not have been able to participate, had they had to travel. We next asked participants in Health Net to tell us how important it was to attend the telecourse series at their workplace. One-half of the participants stated that this was "very important" to them. Most of the remaining (42.9%) responded that it was "somewhat important." These figures are significant, in that one of AHEC's goals was to meet the needs of their clientele by offering continuing education programming at their workplace. As the results indicate, the majority of participants indeed place a high value on receiving this continuing education service at

their workplace.

We found that for participants in the AIDS Education Series, 55.6 percent for the first event, and 49.8 percent for the second, stated that they would not have been able to attend the events had they had to travel sixty miles further than they did.

Over 61 percent of the participants in Invisible Experiences stated that having to travel such a distance would have prohibited their attendence.

Financial Considerations

We asked project co-producers to tell us what sources of income their institution would plan to seek in order to pay for the use of telecommunications in the future. Their remarks included: seeking sponsors, applying for grants, and various other forms of fundraising, including charging fees for an event and for use of the videotape produced from the event.

Dr. Bittel, Public Policy Forum

> "IGS's funds are client based, in-state and local government and private sector. We would utilize this base, through seeking grants, and contracts for future telecommunications events. We would also include a fee structure for future events. The marketplace is not yet use to paying for teleconferencing so this compounds the problems associated with the costs of using the medium."

Dr. Eve, Public Policy Forum

> "We would weave it into the base of our programming. If the vehicle of telecommunications is good, people will pay the difference. We can package it-- as a public service, as a way to present materials to a specific audience, the use of a video of an event for training, etc."

Ms. Dwyer, Health Net

> "We would seek sponsorship from various drug companies. Perhaps eventually we will charge a subscription fee."

Ms. Beebe, AIDS Education Series

> "If we did sponsor another teleconference we would take most of the funds from our existing budget. We never charge fees for our events. We also would not get sponsors. So far our budget has been good, so there hasn't been a problem. If we had to take on the full costs for such a production this might prove too much. We could feasibly seek a grant if we needed to."

Ms. Wilson, Invisible Experiences

> "We would seek grants, contact different companies and ask them for donations (in exchange for credits on the show). We would also host fundraising events, such as a screening of the video that we made from the last event, and charge people admission. We would ask Deaf clubs and schools to help sponsor us. And seek some cost sharing measures and perhaps seek support from television networks."

Dr. Hoffmeister, Invisible Experiences

> "We would write some proposals for grants, seek sponsors, and charge admission. As I mentioned we are also showing the video for fees."

We asked Professor Sternheim to tell us what kind of fee structure might be realistic to charge users of the Physics Forum. His response follows.

Dr. Sternheim, Physics Forum

> "The recurring story seems to be that most schools are broke and so are teachers. Thus, the rich schools (and teachers) would be able to pay a set fee, while others would not. Perhaps a semi-voluntary fee, that would offer baseline services free or at a very minimal cost to everyone, with extra services (i.e., more access time, special services) to those that pay more. The 'extra' fee could be a function of the school's size-- perhaps $100.00 to $200.00 per year. Or, individuals could pay maybe $25.00 per year. We would then supplement this with grants."

PART TWO: THE PROGRAM OBJECTIVES

Program Effectiveness

The Effectiveness of the Programs Based on Participant Expectations

In order to examine whether the program objectives for each of the demonstration projects had been met, we first asked participants to tell us what was the single "most important experience" they expected from the events.

The majority of participants in all but one of the projects cited, as might be expected, gaining a "better understanding of the issue presented" in answer to the question. Participants citing this expectation ranged from 34.9 percent for Invisible Experiences to 73.3 percent for the AIDS Education Series. Just over 30 percent of the participants in Invisible Experiences stated that their most important experience expected was "sharing of opinions with others," while a significantly lower number of respondents from the other events cited this aspect. Over 31 percent of the participants in the first Health Net event stated that the "experience of teleconferencing" was their most important expectation sought. From 6.9 percent of the AIDS Education Series participants to 18.1 percent of the Public Policy Forum respondents also cited this expectation in their responses.

The following table presents an aggregation of the participants' reported "most important experience" expected for all of the teleconference events. Among all participants, 65.7 percent cited a "better understanding of the issue presented" in their responses, and 9.7 percent cited the "experience of teleconferencing."

MOST IMPORTANT EXPERIENCE PARTICIPANTS
EXPECTED FROM THE TELECOMMUNICATIONS PROJECTS

Most Important Experience:	Percent:
Better understanding of the issue presented	65.7%
Experience of teleconferencing	9.7%
Sharing of opinions with others	6.9%
Interchange with panelists	6.1%
Other (inc., comparison of conference styles, sharing mutual experiences, obtaining educational credit)	3.4%
More than one, or all of the above	8.3%
Total	100.0%

Participants were then asked if their expected experience for the teleconference projects had been fulfilled. An aggregation of responses for this question shows that the majority of participants in all of the projects responded affirmatively. Among all responding project participants, 63.5 percent stated that their expectations had been fulfilled, and almost all of the remaining stated that their expectations had at least been "partially" reached.

WERE PARTICIPANTS' EXPECTATIONS FULFILLED?

Yes	63.5%
Partially	32.1%
No	3.4%
Could not say	1.0%
Total	100.0%

When we compare whether or not participants cited their expected experience as having been fulfilled with what that expectation was, we find that among all participants, 62.3 percent of those most wanting a "better understanding of the issue presented" felt that this expectation had been met. It is significant to note that 84.0 percent of those seeking the "experience of teleconferencing" felt that this expectation had been met. The complete correlation appears below, followed by a summary of individual project responses regarding participants' expected experiences and whether or not these were fulfilled.

MOST IMPORTANT EXPERIENCE PARTICIPANTS EXPECTED FROM THE TELECOMMUNICATIONS PROJECTS BY WHETHER OR NOT THIS EXPECTATION WAS MET

	Was Expectation Fulfilled?:			
Most Important Experience:	Yes	Partially	No	Could Not Say
Better understanding of the issue presented	62.3%	34.2%	2.9%	.6%
Experience of teleconferencing	84.0%	14.0%	2.0%	0.0%
Sharing of opinions with others	48.6%	37.1%	8.6%	5.7%
Interchange with panelists	62.5%	34.4%	3.1%	0.0%
Other	44.4%	50.0%	5.6%	0.0%
More than one, or all of the above	69.8%	25.6%	4.7%	0.0%

When asked whether or not their expectations had been fulfilled, 73.5 percent of the Public Policy Forum participants answered "yes." Almost all of the remaining answered "partially." All Public Policy Forum participants citing the "experience of teleconferencing" as their "most important experience" expected from the project, stated that their expectation had been met. Of those who stated that a "better understanding of the issue presented" was their most important experience expected, 65.3 percent stated that this expectation had been fulfilled.

Whether or not participants' expectations were fulfilled directly correlated to their overall rating of the project. All but one of the Public Policy Forum respondents whose expectation had been fulfilled rated the project as being "excellent" or "good" (almost half rating it as "excellent"). Whereas, only one respondent whose expectations had been "partially" fulfilled rated the Public Policy Forum as "excellent."

Just over 70 percent of the participants for the first Health Net telecourse, and 50.0 percent from the second felt that their expectations had been fulfilled, with most of the remaining stating that their expectations had been at least "partially" met. Of the participants in the first telecourse, 47.1 percent of the respondents whose "most important experience" was to gain a "better understanding of the subject presented," reported that their expectation was fulfilled. Over 90 percent of those whose primary expectation was to "experience the use of telecommunications" stated their expectation had been met. For the second event, only 33.3 percent of those participants seeking a "better understanding of the subject presented" stated that this expectation had been met. Such a low fulfillment, in terms of gaining more knowledge about the subject presented, points to a possible reason behind the lower participant ratings found for this telecourse (see, The Participant Perspective).

When asked whether their expectations had been fulfilled, 63.4 percent for the first AIDS Education Series event and 59.0 percent for the second event stated "yes." Almost all of the remaining answered "partially."

Participant comments included:

"I liked the approach of the various colleges in meeting the issue."

"I was glad to see that so much effort is going on to educate so many 'types' of people."

"Specifically, networking to find leads for more information."

"An excellent program was presented."

"Very good. The people on the panel dealt with the issue very well. It was a good selection and coverage of different aspects in regard to the disease."

"Good information with little travel."

"I finally feel we're headed in a positive direction to educate about AIDS the schools."

"It was an overall excellent presentation on AIDS and education. It was nice to meet with other educators at area schools and know we're all up-to-date on information and techniques."

"Information was not new. It was good to hear everyone speaking the same language about the importance of teaching about AIDS in a frank, informative, and compassionate way."

"All panelists reinforced belief that AIDS should be taught. But there was not enough emphasis on teaching about AIDS."

"Some technical problems-- hearing buzzing, etc. Still amazing to have the interaction statewide, though!"

"It was very tough to hear speakers and concentrate in gym (hot), with writing floating across the television screen."

"Not enough time during presentation for questions/answers."

"Far too basic."

When we compared whether or not participants stated that their expectations for the AIDS Education Series had been met by what those expectations were, we found that 68.6 percent of those desiring a "better understanding of the issue presented" felt that that this expection had been fulfilled in the first event. When we make the same comparison for "Teaching AIDS in High School," we find that 61.6 percent of those whose most important expected experience was a "better understanding of the issue presented" felt that their expectation had been fulfilled. Almost 70 percent of those desiring both a "better understanding of the issue presented" and the "experience of teleconferencing" felt that their expectations had been fulfilled.

We also compared the participants' ratings of the AIDS Education Series by whether they felt their expected experience had been fulfilled. For "Confronting AIDS on Campus," we find that 30.2 percent of those whose expectation had been fulfilled rated the teleconference as being "excellent," with all but 7.0 percent of the remaining respondents rating it as "good." Of those who felt that their expectation had only been "partially" fulfilled, 58.3 percent rated the event as "good," almost all of the remainder rated it

as "fair."

"Teaching AIDS in High School" was given an "excellent" rating by 45.8 percent of the respondents whose expectation had been fulfilled, and a rating of "good" by nearly all of the remaining participants who regarded their expectation as fulfilled. Of those respondents who stated that their expectation had only been "partially" fulfilled, 8.6 percent rated it as being "excellent," while 54.8 percent rated it as "good."

Almost three-quarters of the Invisible Experiences respondents stated that their expectations had been met. Almost all of the remaining stated that their expectations had been at least "partially" fulfilled. Only one participant responded that their expectation had not been fulfilled.

Participant comments included:

"Wonderful!"

"I am a very basic sign language student with no knowledge or experience with Deaf culture and this opened one of many doors that need to be opened."

"We need to do more of it on live broadcasting statewide."

"Too few parents attended. I feel if this was an evening or weekend program more would have attended."

We also compared the overall rating that Invisible Experiences participants gave the teleconference to whether their expected experience had been fulfilled. As we might anticipate, those whose expectations were fulfilled rated the event higher than those whose expectations had been only "partially" fulfilled. Of those respondents who stated that their expectations had been met, 46.9 percent rated the event as "excellent" and 53.1 percent rated it as "good." Just under 40 percent of those who responded that their expectations had been "partially" fulfilled rated the event as "excellent," while 50.0 percent rated it as "good" and 12.5 percent viewed it as "fair."

We wanted to know from participants in the Physics Forum what their expectation of the project had been, and whether or not this expectation had

been fulfilled. Three-quarters of the responding users stated that their expectation had been satisfied, while most of the remaining (19.2 percent) stated that their expectation had been "partially" fulfilled.

Participant comments included:

"I thought it would be a useful source of information and a way to communicate to colleagues...It has lived up to all my expectations and more. I receive messages from fellow professionals and find lots of interesting, useful information for my computer science work. It is very easy to use, no connect problems."

"Was looking for ways to communicate with other teachers, and exchange ideas...Exceeded expectations, I have made many contacts. Really encouraged telecommunications use in the school."

"A way to keep in touch with other computing educators...It would be nice if more people used the board, its a great way for educators statewide to keep in touch."

"To communicate with other physics teachers or their materials, to determine whether my approach, content and level of physics measured up to the standards at other schools."

"Resource materials, test banks, workshops, programs, contact with U. Mass., Amherst physics professors."

"A possible source of information to broaden and update our physics curriculum...It has been very beneficial in the information it has made available to me."

"To gain ideas, information...Absolutely an exceptional resource. It gives me ideas, programs, etc."

"I was skeptical at first, but since I have used it, it has proven invaluable for my classes."

"Thought it would be limited...Forum provides more than I expected and is helpful to me in publicizing news for greater Boston Physics group."

"Assumed it would be more useful for physics teachers, than for me...Beyond my expectations."

"I didn't think there would be as much information as there is for computer educators...I am especially impressed by the ability of MASSCUE members to use the Forum for information exchange. I think the Forum far exceeds my expectations in every way."

"I had anticipated extensive use-- and expected it to help me in my teaching...No real fault of the Forum-- we have a Commodore at

our school and my computer is a Commodore. There is limited material for these type computers."

The Effectiveness of the Programs Based on the Learning Experiences of the Participants

We also asked participants to give us an assessment of their "understanding of, or level of expertise on," the issues presented prior to attending the teleconferences. An aggregation of the responses to this question shows that among all participants, only 12.8 percent reported having a "very high" understanding of the issues presented prior to the teleconference projects, and an additional 47.5 percent reported having a "high" understanding. The majority of the remaining respondents indicated that they had "somewhat of an understanding" of the issues presented prior to the events. The complete aggregation follows.

PARTICIPANTS' SELF-REPORTED UNDERSTANDING OF THE ISSUES PRESENTED PRIOR TO THE TELECONFERENCES

Issue Understanding:	Percent:
Very high	12.8%
High	47.5%
Somewhat of an understanding	35.3%
Very low understanding	4.4%
Total	100.0%

We also asked participants to tell us what their level of understanding of the issues presented in each of the projects was following their participation in the events. An aggregation of the responses to this question shows that the telecommunications projects were highly successful in presenting the information to participants in such a way that allowed them to gain an increased understanding of the information presented. Among all responding project participants, 84.3 percent stated that their understanding

of the issues presented had increased after having participated in the events. Almost one-quarter of participants stated that their understanding had "improved significantly."

PARTICIPANTS' SELF-REPORTED UNDERSTANDING
OF THE ISSUES PRESENTED FOLLOWING THE TELECONFERENCES

Issue Understanding:	Percent:
Improved significantly	23.9%
Improved somewhat	60.4%
Remained about the same	15.7%
Total	100.0%

When we take the aggregated results for the respondents' reported level of understanding prior to the teleconference events and compare these to what their reported level of understanding was after having participated in the events, we find further evidence that participants indeed gained significantly from their experiences. The results show that 59.7 percent of those who reported having a "very high level" of understanding prior to the events indicated that their level of understanding had either "improved significantly" or "improved somewhat." Of those reporting a "high" level of understanding prior to the teleconferences, 83.2 percent stated that their level of understanding had improved either "significantly" or "somewhat." Even more noteworthy, however, are the responses of the remaining participants. Of those respondents who reported having either "somewhat of an understanding" or a "low" understanding prior to the events, 93.0 percent of the former and all of the later, reported that their level of understanding had either "improved significantly" or "improved somewhat" after their participation in the events. The complete tabulation follows.

PARTICIPANTS' SELF-REPORTED UNDERSTANDING OF THE ISSUES PRESENTED PRIOR TO THE TELECONFERENCES BY THEIR SELF-REPORTED UNDERSTANDING FOLLOWING THE TELECONFERENCES

		Issue Understanding Prior to Event:			
		Very High	High	Somewhat	Low
Issue Understanding After Event:	Improved significantly	19.4%	20.4%	26.2%	57.1%
	Improved somewhat	40.3%	62.8%	66.8%	42.9%
	Remained about the same	40.3%	16.8%	7.0%	0.0%

A summary of the responses regarding the participant level of understanding prior to, and upon conclusion of the teleconference events for each individual project follows.

Just over 9 percent of Public Policy Forum participants reported that their understanding of the issues presented in the project, prior to the teleconference events was "very high"; 38.4 percent reported a "high" level of understanding; 45.3 percent reported having "somewhat" of an understanding; and 7.0 percent reported a "low" level of understanding.

When asked if participation in the Public Policy Forum had improved their understanding of the issues, an overwhelming majority responded that they felt their knowledge had either "improved significantly" or "improved somewhat." Just under 26.0 percent reported their level of understanding as having "improved significantly" and 59.3 percent stated that their understanding had "improved somewhat."

It is clear that the Public Policy Forum was successful in increasing participants' awareness of the issues presented. Of the participants who came into the events with a "low" understanding of the issues to be presented, all but one stated that their level of understanding of the issue had "improved significantly" after participating in the project. Of those

with "some" prior knowledge of the issues, 28.2 percent of the respondents stated that their understanding of the issues had "improved significantly," and 61.5 percent stated that it had "improved somewhat."

Almost 36 percent of Health Net participants in the first event, and 15.8 percent of those in the last telecourse reported that their level of understanding of the subjects presented prior to the telecourses was "high"; 43.6 percent for the first telecourse, and 42.1 percent for the second reported having "somewhat of an understanding"; 15.4 percent for the first, and 26.3 percent for the second, reported that their prior understanding was "high on some elements, low on others"; and 5.1 percent for the first telecourse, and 15.8 percent for the second, reported a "low" level of prior understanding. At least 94.2 percent of all responding Health Net participants stated that their knowledge or understanding had increased after viewing the telecourse events.

Of the participants in the AIDS Education Series, 15.1 percent of those in the first event, and 12.2 percent of those in the second, reported having a "very high" level of understanding of the issues presented prior to the project; 52.1 percent for the first, and 53.9 percent for the second event, reported having a "high" level of understanding; 31.5 for the first event, and 41.3 for the second, reported having "somewhat" of an understanding; and 1.4 percent for the first, and 2.6 percent for the second event, stated that their level of understanding was "low." When asked whether participation in the project had improved their knowledge or understanding of the issue, at least 82.2 percent of the respondents from both teleconferences stated that their understanding had improved, with at least 25.0 percent of these responding that their understanding had "improved significantly."

We compared the participants' reported level of understanding of the issue presented prior to, and after, the AIDS Education Series. For the first event, all of those with a "very low" level of understanding prior to the event, stated that their understanding had "improved significantly." Of those with "somewhat" of an understanding before the event, 87.0 percent stated that their level of understanding had improved. While 50.0 percent of those reporting a "very high" level of understanding prior to the event,

stated that their understanding had improved.

In comparing the reported level of understanding of participants prior to "Teaching AIDS in High School," to that following the event, we find that 42.9 percent of the respondents with a "very low" level of understanding stated that their knowledge of the issue had "improved significantly," the remainder stated that it had "improved somewhat." Almost all of those respondents with "somewhat" of an understanding prior to the event stated that their knowledge had improved. Over half of those with a "very high" level of understanding prior to the event stated that their understanding had improved.

Participants in Invisible Experiences were also asked to give us an assessment of their understanding of the issue presented in the project, prior to attending the teleconference. Just over 36 percent of the participants responded that their level of understanding was "very high"; 40.9 percent responded that their level was "high"; 15.9 percent stated that they "somewhat" of an understanding; and 6.8 percent stated that they had a "very low" understanding.

When Invisible Experiences respondents were asked whether participation in the teleconference had improved their understanding of the issue, 81.0 percent responded affirmatively. Just over 30 percent stated that their understanding had "improved significantly" and 50.0 percent stated that it had "improved somewhat." Over 85 percent of the respondents whose level of understanding prior to the event was reported as "somewhat of an understanding," stated that their level of understanding had "improved significantly." All of those reporting a "low" level of understanding stated that it had "improved significantly."

The Application of Telecommunications

The Length of the Project Events and Participant Interaction

We also elicited responses from participants about the length of the events and the opportunity provided to ask questions during the teleconference events.

Just over 84 percent of the participants in the Public Policy Forum felt that the length of the project was "about right." Over half of those participating in the first AIDS Education Series event felt that the length of the teleconference was too long. While 17.6 percent of those attending the second event felt similarly. A number of comments were made by participants in the AIDS Education Series regarding both the length of the events and the lack of breaks during the events. Although, there was more utilization of break time during the second event, perhaps leading to the significantly higher number of respondents who felt that the length of the event was "about right."

Seventy percent of the Invisible Experiences respondents stated that the length of the event was "about right." A little over a quarter of the participants, however felt that the event was too long. A few people commented that the lunch break was too long; others stated that the event should have started earlier.

We also asked participants in the demonstration projects to tell us how they felt about the question and answer periods provided during the teleconference events. Over half of the participants in the Public Policy Forum responded that they felt there was "plenty of opportunity" to ask questions, and almost all of the remaining respondents answered that they felt there was an "adequate amount of opportunity." Forty percent of those in the first Health Net telecourse, and 36.8 percent in the second, stated that they felt there was "plenty of opportunity" to ask questions. Just under 37 percent for the first, and 42.1 percent for the second, responded that there was an "adequate amount of opportunity" to ask questions.

Almost 32 percent for the first AIDS Education Series event felt there was "plenty of opportunity" to ask questions, while 34.8 percent felt there was as "adequate amount of opportunity." Of the participants in the second event, 39.4 percent felt there was "plenty of opportunity," and 42.5 percent stated that they felt that there had been an "adequate amount of opportunity."

Almost 40 percent of the responding "Invisible Experiences" participants stated that they felt there was "plenty of opportunity" to ask questions. Almost 37 percent stated that there was an "adequate amount of opportunity" to ask questions.

Project Specific Aspects Relating to the Program of the Events

We asked Health Net participants to tell us what they liked most about the series, and also what they liked least.

Participant comments as to what they liked most about the series included:

"Choice of subjects."

"Convenience."

"Convenience and ability to participate."

"Can attend while at work."

Participant comments as to what they liked least about the series included:

"Not all topics were relevant."

"Internal medicine is not my field. There was nothing relating to pediatrics until the last show."

We asked participants if the information presented in Invisible Experiences had influenced their ideas pertaining to the education of Deaf/hard of hearing children. Almost 60 percent of the respondents had comments to make, most very positive.

Participant comments included:

"Oralism concept proves weak."

"It was very good to hear successful Deaf adults say directly that they'd

have been better off if they had the opportunity to use ASL."

"That total communication is the best and only way to educate Deaf and hard of hearing. I found that oral communication didn't really help children and parents communicate with each other."

"The importance of sign language."

"Important that Deaf children learn to be independent at an early age. Learn to mainstream socially."

"Gave me more of an understanding from the Deaf child's point of view."

"It reinforced many of the beliefs I have in relation to my daughter's Deafness."

"I have always believed in total communication."

We wanted to know from participants in the second event of the AIDS Education Series, "Teaching AIDS in High School," if they had discussed AIDS with their students in the past. If they had discussed the issue with their students, we wanted to know if attending the teleconference had given them any additional teaching materials. If they had not, we wanted to know if the teleconference had helped them decide whether to discuss the issue with their students. Over 75 percent of the respondents stated that they had discussed the issue with their students. It is noteworthy that a very high percentage of all participants in the event stated that they gained new information for the discussion of the issue with their students.

Of those respondents who stated that they had discussed the issue with their students, 93.0 percent reported that the events had given them additional teaching materials on AIDS.

Participant comments included:

"Experiences of other teachers and latest research findings."

"Audiovisuals, plus the thrust of our program will now be enhanced."

"I found additional resources. Also, it helps to know what others are doing."

"More information about how it is being presented across the state."

"Better curriculum directions, what's been taught and what's ongoing. It gave me a sense that its okay what I'm teaching."

"I am now more confident about the factual information that I present."

"I received tons of information, however, I would like to have known what was used and why it was either disregarded or has continued to be used."

"Nothing that new was presented."

Over 85 percent of those participants stating that they had not discussed the issue with their students were prepared to do so after participating in the teleconference.

Participant comments included:

"I now would have enough knowledge to respond to any of the many unanswered questions that students might have."

"I intend to begin a basic instructional program. The teleconference provided me with brochures and other material resources."

"I feel much more comfortable now."

"I never feel that I want to teach something that I'm hazy about. I think now though I could answer most of the questions that may be asked."

"I would love to, but the superintendent is against it because he feels its the churches' job."

We also wanted to know from participants in the AIDS Education Series how they felt about the on-site question and answer period that followed the teleconference portion of the events. The majority of respondents, 94.2 percent for the first event, and 88.5 percent for the second, felt that it was important to them, but many commented that they were disappointed by the low number of participants who stayed for it.

Participant comments included:

"Best part for new information!"

"Not enough people stayed."

"Not much discussion, most people left at 1:00 pm."

"Most people left, so there was not enough interaction."

Participant Comments Regarding the Program Aspects of the Projects

Finally, we asked participants in all of the projects to give us their suggestions for improvements of the events. A partial listing of suggestions referring to the program aspects of the projects follows.

Public Policy Forum:

"Too general."

"A little bland-- could have profited from limiting the issues and viewpoints, maybe just labor and industry representatives. Everything got watered down."

"Good discussion of problems and issues, but solutions and alternatives less so."

"Hoped for more in-depth discussions and analyses."

"Perhaps topic was too broad, encouraged generalities."

"Social time before and after-- the networking, while not fundable by grants, is very important."

Health Net:

"Less questions, call only one or two centers for each question. Visuals should be larger, chart's were difficult to read."

"Perhaps ask one or two centers to respond to each question in order to save time instead of polling every center."

"If it moved faster, more information could be covered. Focus the slides better."

"A VCR component would be the ultimate improvement, allowing retainment of material for future viewing in the most cost effective way."

"More programs that relate to common health problems seen in an ambulatory setting."

"Today's talk was quite complex, possibly tailor format more to the level of mixed audience in community setting. Let some nurses in there!"

AIDS Education Series:

"This is the first I've ever been to. It was good, however, some of the presenters tended to be a bit longwinded (which is okay, but each presenter's material overlapped)."

"Needs to be better organized. It seemed somewhat disjointed."

"This was my first telecommunication workshop and I was impressed and throughly enjoyed it! A workshop addressing these issues for a younger community would be helpful, and much needed."

"Somehow to build in a break. Hard to concentrate fully for such an extended period of time."

"Have a snack or lunch break. It was also good to be for free."

"Don't loose the human touch-- make coffee in the AM available, and a lunch break."

"More time in between panels to ask questions."

"I expected more discussion between 1 and 2pm [on-site], perhaps having people bring bag lunches or providing (for a fee) box lunches might have encouraged people to stay. Have more sites north of Boston. Otherwise, everything was extremely well done!"

"Have in-town site [Boston] other than University of Massachusetts."

"More locations, our group [North Shore] still had to travel quite far."

"Gym atmosphere [U. Mass.] was not conducive to asking questions. No contact with colleagues-- no time avaliable."

Invisible Experiences:

"It was fun!"

"The time the conference started was too late (10 am). Also, the lunch break was too long."

"The moderator should allow only one or two panelists to answer each question. The afternoon moved slowly and people at the site grew bored and restless waiting for their turn."

"Introductions at the sites among participants would have been helpful (pre-teleconference). Lunch places in the area could have been announced or suggested to continue interaction during lunch."

"Better scheduling to allow for more parental attendence."

Physics Forum:

"More biology!"

"Have more math related materials."

"Open it to other science disciplines. Increase the scope and depth of the help command."

"As good as visiting other schools-- which can't be done often. Can exchange ideas with other teachers-- response has generally been above expectations. Can facilities include information and exchange among science teachers K-8? Math/Logo k-8?"

"Good for networking, but it would be more useful if it (and the Forum's title) invited usage by teachers from disciplines other than math and science-- a statewide bulletin board service is needed!"

"Networking is the important aspect of the Forum. Keeping in touch with colleagues in eastern Mass. A great networking tool for information exchange. There is a need for a free network for educators to keep in touch at least statewide, if not all New England. More lines and ability to allow educators to converse in real time would improve the Forum."

"Excellent mechanism for professional dialog. Would like to see periodic FIDONET meetings in local areas."

Conclusion

The demonstration projects implemented by the Massachusetts Corporation for Educational Telecommunications through its Technical Assistance Program clearly indicated an interest in, and a need for, telecommunications services for educational applications among a variety of Massachusetts users, including: higher education; secondary schools; special education; state agencies; health care; and public managers. Each of the five demonstration projects' co-producers expressed interest in future applications of the telecommunications medium. Three project co-producers are continuing, repeating, and/or expanding their educational telecommunications services with the assistance of MCET.

In general, the demonstration project co-producers felt positive about their applications of the medium. Through the use of telecommunications, co-producers were able to present a range of issues to participants at locations that they otherwise may not have been able to reach, and without participants having to travel very far to attend the events. Project goals, as set by the co-producers, were for the most part successfully achieved. In addition, the projects were viewed as valuable learning experiences, enabling the co-producers to test the use of telecommunications for potential future applications.

Participants rated the telecommunications projects highly. Among all responding participants in the projects, 83.6 percent gave overall ratings to the events of either "excellent" or "good." When asked to rate various elements of the projects, at least 85.7 percent of the participants judged the events as "satisfactory" or better. The telecommunications medium also compared very favorably to other in-person conferences or workshops that participants had attended. An average of 86.9 percent of the responding participants felt that the telecommunications projects were either "more effective" than, or "about as effective" as, other in-person events they had attended. Participants felt comfortable with the medium, and clearly gained from their experiences. Participants also enjoyed the interactive format of the medium which allowed them to communicate with colleagues from all around the state.

Appendix A:
Pilot Project Criteria

The Massachusetts Corporation for Educational Telecommunications (MCET) is encouraging --- through the subsidization of transmission costs and the provision of technical assistance --- the development of pilot projects demonstrating the educational uses of statewide telecommunications capacity.

The goal of the pilot projects is to provide MCET and its clients with a clearer understanding of: ***a)*** *whether there is real demand for educational telecommunications services;* ***b)*** *how much these services will cost to provide;* ***c)*** *how much users can pay for such telecommunications services; and* ***d)*** *what benefits the delivery of educational telecommunications can provide.*

Since MCET must utilize existing telecommunications capacity for the pilot projects, and since the Corporation's funding for such projects is limited, it is important that each projects be achievable at reasonable cost and compatible with the capabilities of available existing capacity. MCET seeks a mix of pilot projects reflecting a variety of potential educational services that can be delivered via telecommunications (e.g., computer education for primary school pupils, worker training, professional education, etc.). The mix of projects should also reflect a variety of telecommunications uses (e.g., teleconferencing, one-way educational delivery, data transmission, etc.).

Pilot projects must:

1. *Be educational in intent;*
2. *Respond to a real educational services delivery need within the client organization and/or within the state;*
3. *Be capable of implementation via available existing telecommunications capacity;*
4. *Benefit organizations and/or individuals in more than one Massachusetts city or town;*
5. *Be projects which the client organization intends to repeat or expand (Technical Assistance Program Form should indicate how such repetition or expansion would be funded);*
6. *Have measurable objectives (the Technical Assistance Form should make clear how the success of the project will be determined);*
7. *Include a viable plan for assuring an audience; and*
8. *Reflect the client institution's commitment to using telecommunications for the distribution of educational services and the ability of the institution to fund such use.*

Appendix B:
Oral Interviewees

Public Policy Forum

Co-Producers: Dr. Peter Bittel, Institute for Governmental Services, University of Massachusetts, Amherst

Dr. Arthur Eve, Institute for Governmental Services

Dr. Frank Rife, Institute for Governmental Services

Health Net

Co-Producer: Ms. Maryann Dwyer, Area Health Education Center, Boston University School of Medicine

Receive Site Coordinators: Ms. Pat Mirisola

Ms. Susan O'Hara

Ms. Sandy Hubbarb

Ms. Kathy Walsh

AIDS Education Series

Co-Producer: Ms. Deanne Beebe, Office of Human Resources, Massachusetts Department of Public Health

Receive Site Coordinators: Ms. Andy Lineweaver

Mr. Donald O'Dell

Ms. Susan Thomas

Invisible Experiences

Co-Producers: Ms. Patti Wilson, Deaf Media Coalition

Dr. Robert Hoffmeister, Center for the Study of Communication and Deafness, Boston University

Receive Site Coordinators: Ms. Juliet Singer

Ms. Darlene Kemp

Physics Forum

Co-Producer: Dr. Morton Sternheim, Department of Physics and Astronomy, University of Massachusetts, Amherst

APPENDIX 3

100TH CONGRESS
1ST SESSION

S. 778

IN THE HOUSE OF REPRESENTATIVES

APRIL 27, 1987

Referred to the Committee on Education and Labor

AN ACT

To authorize a star schools program under which grants are made to educational telecommunications partnerships to develop, construct, and acquire telecommunications facilities and equipment in order to improve the instruction of mathematics, science, and foreign languages, and for other purposes.

Be it enacted by the Senate and House of Representatives of the United States of America in Congress assembled,

SHORT TITLE

SECTION 1. This Act may be cited as the "Star Schools Program Assistance Act".

PROGRAM AUTHORIZED

SEC. 2. The Education for Economic Security Act is amended by adding at the end thereof the following new title:

"TITLE IX—STAR SCHOOLS PROGRAM

"SHORT TITLE

"SEC. 901. This title may be cited as the 'Star Schools Program Assistance Act'.

"STATEMENT OF PURPOSE

"SEC. 902. It is the purpose of this title to encourage improved instruction in mathematics, science, and foreign languages through a star schools program under which demonstration grants are made to eligible telecommunications partnerships to enable such eligible telecommunications partnerships to develop, construct, and acquire telecommunications audio and visual facilities and equipment and obtain technical assistance for the use of such facilities.

"PROGRAM AUTHORIZED

"SEC. 903. (a) GENERAL AUTHORITY.—The Secretary is authorized, in accordance with the provisions of this title, to make grants to eligible telecommunications partnerships to develop, construct, and acquire telecommunications facilities and equipment and for technical assistance.

"(b) AUTHORIZATION OF APPROPRIATIONS.—(1) There is authorized to be appropriated $100,000,000 for the period beginning October 1, 1987, and ending September 30, 1992.

"(2) No appropriation in excess of $60,000,000 may be made in any fiscal year pursuant to paragraph (1) of this subsection.

"(c) LIMITATIONS.—(1) A demonstration grant made to an eligible telecommunications partnership under this title may not exceed $20,000,000.

"(2) Not less than 50 percent of the funds available in any fiscal year under this Act shall be used for the cost of facilities, equipment, teacher training or retraining, technical assistance, or programming, for local educational agencies which are eligible to receive assistance under title I of the Elementary and Secondary Education Act of 1965 (as modified by chapter 1 of the Education Consolidation and Improvement Act of 1981).

"ELIGIBLE TELECOMMUNICATIONS PARTNERSHIPS

"SEC. 904. (a) GENERAL RULE.—In order to be eligible for demonstration grants under this title, an eligible telecommunications partnership shall consist of—

"(1) a public agency or corporation established for the purpose of developing and operating telecommunications networks to enhance educational opportunities provided by educational institutions, teacher training centers, health institutions, and industry, except that any such agency or corporation shall contain representation of the interests of elementary and secondary schools who are eligible to participate in the program

under title I of the Elementary and Secondary Education Act of 1965 (as modified by chapter 1 of the Education Consolidation and Improvement Act of 1981); or

"(2) a partnership which includes three or more of the following which will provide a telecommunications network:

"(A) a local educational agency, which has a significant number of elementary and secondary schools which are eligible for assistance under title I of the Elementary and Secondary Education Act of 1965 (as modified by chapter 1 of the Education Consolidation and Improvement Act of 1981) or elementary and secondary schools operated for Indian children by the Department of the Interior eligible under section 111(d)(2) of the Elementary and Secondary Education Act of 1965,

"(B) a State educational agency,

"(C) an institution of higher education,

"(D) a teacher training center, or

"(E)(i) a public agency with experience or expertise in the planning or operation of a telecommunications network,

"(ii) a private organization with such experience, or

"(iii) a public broadcasting entity with such experience.

"(b) SPECIAL RULE.—An eligible telecommunications partnership must be organized on a statewide or multistate basis.

"APPLICATIONS

"SEC. 905. (a) APPLICATION REQUIRED.—Each eligible telecommunications partnership which desires to receive a demonstration grant under this title may submit an application to the Secretary, at such time, in such manner, and containing or accompanied by such information as the Secretary may reasonably require.

"(b) CONTENTS OF APPLICATION.—Each such application shall—

"(1) describe the telecommunications facilities and equipment and technical assistance for which assistance is sought which may include—

"(A) the design, development, construction, and acquisition of State or multistate educational telecommunications networks and technology resource centers;

"(B) microwave, fiber optics, cable, and satellite transmission equipment;

"(C) reception facilities;

"(D) satellite time;

"(E) production facilities;

"(F) other telecommunications equipment capable of serving a wide geographic area;

"(G) the provision of training services to elementary and secondary school teachers (particularly teachers in schools receiving assistance under title I of the Elementary and Secondary Education Act of 1965 (as modified by chapter 1 of the Education Consolidation and Improvement Act of 1981)) in using the facilities and equipment for which assistance is sought; and

"(H) the development of educational programming for use on a telecommunications network;

"(2) demonstrate that the eligible telecommunications partnership has engaged in sufficient survey and analysis of the area to be served to ensure that the services offered by the telecommunications partnership will increase the availability of courses of instruction in mathematics, science, and foreign languages;

"(3) describe the teacher training policies to be implemented to ensure the effective use of the telecommunications facilities and equipment for which assistance is sought;

"(4) provide assurances that the financial interest of the United States in the telecommunications facili-

ties and equipment will be protected for the useful life of such facilities and equipment;

"(5) provide assurances that a significant portion of the facilities, equipment, technical assistance, and programming for which assistance is sought will be made available to elementary and secondary schools of local educational agencies which have a high percentage of children counted for the purpose of title I of the Elementary and Secondary Education Act of 1965 (as modified by chapter 1 of the Education Consolidation and Improvement Act of 1981);

"(6) describe the manner in which traditionally underserved students will participate in the benefits of the telecommunications facilities, equipment, technical assistance, and programming assisted under this Act; and

"(7) provide such additional assurances as the Secretary may reasonably require.

"(c) APPROVAL OF APPLICATION; PRIORITY.—The Secretary shall, in approving applications under this title, give priority to applications which demonstrate that—

"(1) a concentration and quality of mathematics, science, and foreign language resources which, by their distribution through the eligible telecommunications partnership, will offer significant new educational op-

portunities to network participants, particularly to traditionally underserved populations and areas with scarce resources and limited access to courses in mathematics, science, and foreign languages;

"(2) the eligible telecommunications partnership has secured the direct cooperation and involvement of public and private educational institutions, State and local government, and industry in planning the network;

"(3) the eligible telecommunications partnership will serve the broadest range of institutions, including public and private elementary and secondary schools (particularly schools having significant numbers of children counted for the purpose of title I of the Elementary and Secondary Education Act of 1965 (as modified by chapter 1 of the Education Consolidation and Improvement Act of 1981)), programs providing instruction outside of the school setting, institutions of higher education, teacher training centers, research institutes, and private industry;

"(4) a significant number of educational institutions have agreed to participate or will participate in the use of the telecommunications system for which assistance is sought;

"(5) the eligible telecommunications partnership will have substantial academic and teaching capabilities including the capability of training, retraining, and in-service upgrading of teaching skills;

"(6) the eligible telecommunications partnership will serve a multistate area; and

"(7) the eligible telecommunications partnership will, in providing services with assistance sought under this Act, meet the needs of groups of individuals traditionally excluded from careers in mathematics and science because of discrimination, inaccessibility, or economically disadvantaged backgrounds.

"(d) GEOGRAPHIC DISTRIBUTION.—In approving applications under this title, the Secretary shall assure an equitable geographic distribution of grants.

"DISSEMINATION OF COURSES AND MATERIALS UNDER THE STAR SCHOOLS PROGRAM

"SEC. 906. (a) Each eligible telecommunications partnership awarded a grant under this Act shall report to the Secretary a listing and description of available courses of instruction and materials to be offered by educational institutions and teacher training centers which will be transmitted over satellite, specifying the satellite on which such transmission will occur and the time of such transmission.

"(b) The Secretary shall compile and prepare for dissemination a listing and description of available courses of

instruction and materials to be offered by educational institutions and teacher training centers equipped with satellite transmission capabilities, as reported to the Secretary under subsection (a) of this section.

"(c) The Secretary shall distribute the list required by subsection (b) of this section to all State educational agencies.

"EVALUATION

"SEC. 907. (a) EVALUATION.—The Office of Technology Assessment may, upon request, beginning after September 30, 1987, conduct a thorough evaluation of the use of the telecommunications systems supported by grants made under this title.

"(b) REPORTS.—The Office of Technology Assessment shall, after a request made under subsection (a), prepare and submit a report to the Congress, on the evaluation authorized by this subsection.

"STUDY OF FEASIBILITY OF AN EDUCATIONAL SATELLITE

"SEC. 908. (a) The Office of Technology Assessment may, upon request, conduct a study and evaluation of the cost of designing, building, and launching a satellite for educational purposes, together with an analysis of—

"(1) the demand for the use of a satellite for educational purposes; and

"(2) the ability of users of such a system to repay the cost of such a satellite.

"(b) If the Office of Technology Assessment finds, after a study and evaluation conducted under subsection (a), that the cost entailed in designing, building, and launching such a satellite could be repaid within 10 years by the potential users of such a satellite, the Office of Technology Assessment shall notify the Congress of its findings.

"DEFINITIONS

"SEC. 909. As used in this title—

"(1) the term 'educational institution' means an institution of higher education, a local educational agency, and a State educational agency;

"(2) the term 'institution of higher education' has the same meaning given that term under section 1201(a) of the Higher Education Act of 1965;

"(3) the term 'local educational agency' has the same meaning given that term under section 198(a)(10) of the Elementary and Secondary Education Act of 1965;

"(4) the term 'public broadcasting entity' has the same meaning given that term in section 397 of the Communications Act of 1934;

"(5) the term 'Secretary' means the Secretary of Education;

"(6) the term 'State educational agency' has the same meaning given that term under section 198(a)(7)

of the Elementary and Secondary Education Act of 1965; and

"(7) the term 'State' means each of the several States, the District of Columbia, the Commonwealth of Puerto Rico, Guam, American Samoa, the Virgin Islands, the Trust Territory of the Pacific Islands, and the Commonwealth of the Northern Mariana Islands.".

Passed the Senate April 23 (legislative day, April 21), 1987.

Attest: WALTER J. STEWART,

Secretary.

APPENDIX 4

SENATE . . . . . No. 220

By Mr. Boverini, a petition (accompanied by bill, Senate, No. 220) of Walter J. Boverini, Salvatore R. Albano, Stanley C. Rosenberg and John W. Olver for legislation relative to membership on the Board of Directors of the Massachusetts Corporation for Educational Telecommunications. Education.

The Commonwealth of Massachusetts

In the Year One Thousand Nine Hundred and Eighty-Seven.

AN ACT RELATIVE TO MEMBERSHIP ON THE BOARD OF DIRECTORS OF THE MASSACHUSETTS CORPORATION FOR EDUCATIONAL TELECOMMUNICATIONS.

Be it enacted by the Senate and House of Representatives in General Court assembled, and by the authority of the same, as follows:

The second paragraph of section 3 of Chapter 560 of the Acts of 1982 is hereby amended by striking out said paragraph and inserting in place thereof the following new paragraph: —

MCET shall be governed and its powers exercised by a board of directors which shall consist of nineteen directors and shall be representative of the racial, ethnic and cultural diversity of the commonwealth, the commissioner of administration, the secretary of economic development and manpower affairs, the commissioner of the department of education, the chancellor of the board of regents of higher education, the president of the University of Massachusetts, the president of the WGBH Educational Foundation, the Chairman of the advisory council of MCET and twelve persons appointed by the governor, three of whom shall be presidents of private institutions of higher education in the commonwealth, one of whom shall be the president of a Massachusetts state college, one of whom shall be the president of a Massachusetts community college, one of whom shall be a representative appointed from a list of at least three nominees of the Massachusetts Municipal Association, one of whom shall be the superintendent of a kindergarten through twelfth grade local public school district in the commonwealth and five of whom shall be bona fide representatives of other major sectors significantly affected by MCET, including representatives of business, high technology and telecommunications sectors of the Massachusetts economy. Each member appointed by the governor shall serve for a term of seven years and thereafter until his or her successor is appointed, except that in making the initial appointments, the governor shall appoint one member to serve for two years, two to serve for three years, two to serve for four years, two to serve for five years, two to serve for six years and two to serve for seven years. Any person appointed to fill a vacancy in the office of a member of the board shall be appointed in a like manner and shall serve for the remainder of the unexpired term. Any appointed member shall be eligible for reappointment, and may be removed from his or her office by the governor for cause. Nine directors shall constitute a quorum and the affirmative vote of the majority of the directors present and eligible to vote shall be necessary for any action to be taken by the board. The directors shall serve without compensation, but shall be entitled to reimbursement for actual and necessary expenses incurred in the performance of their duties. The board shall meet no less than four times each year, and shall have final authority over the activities of MCET.

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S 221

Chapter 110.

THE COMMONWEALTH OF MASSACHUSETTS

In the Year One Thousand Nine Hundred and Eighty-seven

AN ACT MAKING A CORRECTIVE CHANGE TO THE MASSACHUSETTS CORPORATION FOR EDUCATIONAL TELECOMMUNICATIONS LAW.

Be it enacted by the Senate and House of Representatives in General Court assembled, and by the authority of the same, as follows:

Section 9 of chapter 560 of the acts of 1982 is hereby amended by striking out, in line 3, the word "seven" and inserting in place thereof the word:- eight.

House of Representatives, May 28, 1987.

Passed to be enacted, George Keverian, Speaker.

In Senate, May 28, 1987.

Passed to be enacted, William M. Bulger, President.

June 3, 1987.

Approved,

Governor.

THE COMMONWEALTH OF MASSACHUSETTS

In the Year One Thousand Nine Hundred and Eighty-seven

AN ACT RELATIVE TO MEMBERSHIP ON THE ADVISORY COUNCIL OF THE MASSACHUSETTS CORPORATION FOR EDUCATIONAL TELECOMMUNICATIONS.

Be it enacted by the Senate and House of Representatives in General Court assembled, and by the authority of the same, as follows:

Section 3 of chapter 560 of the acts of 1982 is hereby amended by striking out the eighth paragraph and inserting in place thereof the following paragraph:-

There shall be an advisory council to MCET, which shall consist of no more than fifteen members appointed by the governor for terms of five years who shall be broadly representative of the racial, ethnic, and cultural diversity of the commonwealth and of potential providers and users of said network and who are not otherwise represented on the board of directors of MCET, including, but not limited to, representatives of the following sectors: teacher labor organizations; the board of library commissioners; hospitals in the commonwealth; higher education programs in medicine, education and engineering, and the nursing and legal professions. The council shall evaluate the telecommunications needs of various sectors of the commonwealth and recommend to the MCET board of directors programs and activities designed to serve any such needs. The council shall meet no less than three times a year and shall annually elect a chairman from among its membership. Eight members of the advisory council shall constitute a quorum.

House of Representatives, May 26, 1987.

Passed to be enacted, George Keverian, Speaker.

In Senate, May 26, 1987.

Passed to be enacted, William M. Bulger, President.

June 3, 1987.

Approved,

Governor.

APPENDIX 5

STATEMENT OF WORK FOR THE PHASE II DESIGN, DEVELOPMENT AND OPERATIONS OF THE MASSACHUSETTS EDUCATIONAL AND ECONOMIC DEVELOPMENT RELATED TELECOMUNICATION NETWORK

I. INTRODUCTION

In order to establish a method for chronologically sequencing the "Design, Development and Operation of the Massachusetts Educational and Economic Development Related Telecommunication Network" (DD&O of MEED-TN) activities it has been assumed that: 1) the Phase I DD&O MEED-TN activities started in 1984 and will end in July 31, 1987, 2) the Phase II DD&O MEED-TN activities will begin on August 1, 1987 and will end on April 8, 1988, and 3) the Phase III DD&O MEED-TN activities will begin in April 1988.

This statement of work will identify the tasks, the schedule and the manpower that will be required to achieve the objectives of the Phase II DD&O MEED-TN. The Phase III DD&O MEED-TN will concentrate on: 1) the refinement and upgrading of the Phase I and II DD&O MEED-TN inputs, 2) the planning and definition of the DD&O MEED-TN implementation and operational activities, and 3) the initiation of the MEED-TN installation and operational activities. The Statement of Work for the Phase III DD&O MEED-TN will be written in the last month of the Phase II DD&O MEED-TN period.

II. OBJECTIVES

The primary objective of the Phase II DD&O MEED-TN activities is to provide viable, cost effective and timely network and system design and implementation alternatives for the MEED-TN. In order to achieve this primary objective the following set of supporting objectives have been identified.

1. The provision of such network system design and implementation alternatives that are capable of satisfying the present and future user requirements.

2. The construction of such a network system architecture that is capable of accommodating:
   * Technology and marketing trends
   * Present and future user requirements
   * International, Federal, North American or recognized industry standards
   * Modular implementations
   * The provision of the required network system management administration and security services

3. Provision of such design and implementation alternatives that lend themselves to:
   * Satisfaction of present and future user requirements
   * Graceful growth capability
   * The introduction of such value added enhancements as:
     - increased and high quality services
     - services that woud not be otherwise available

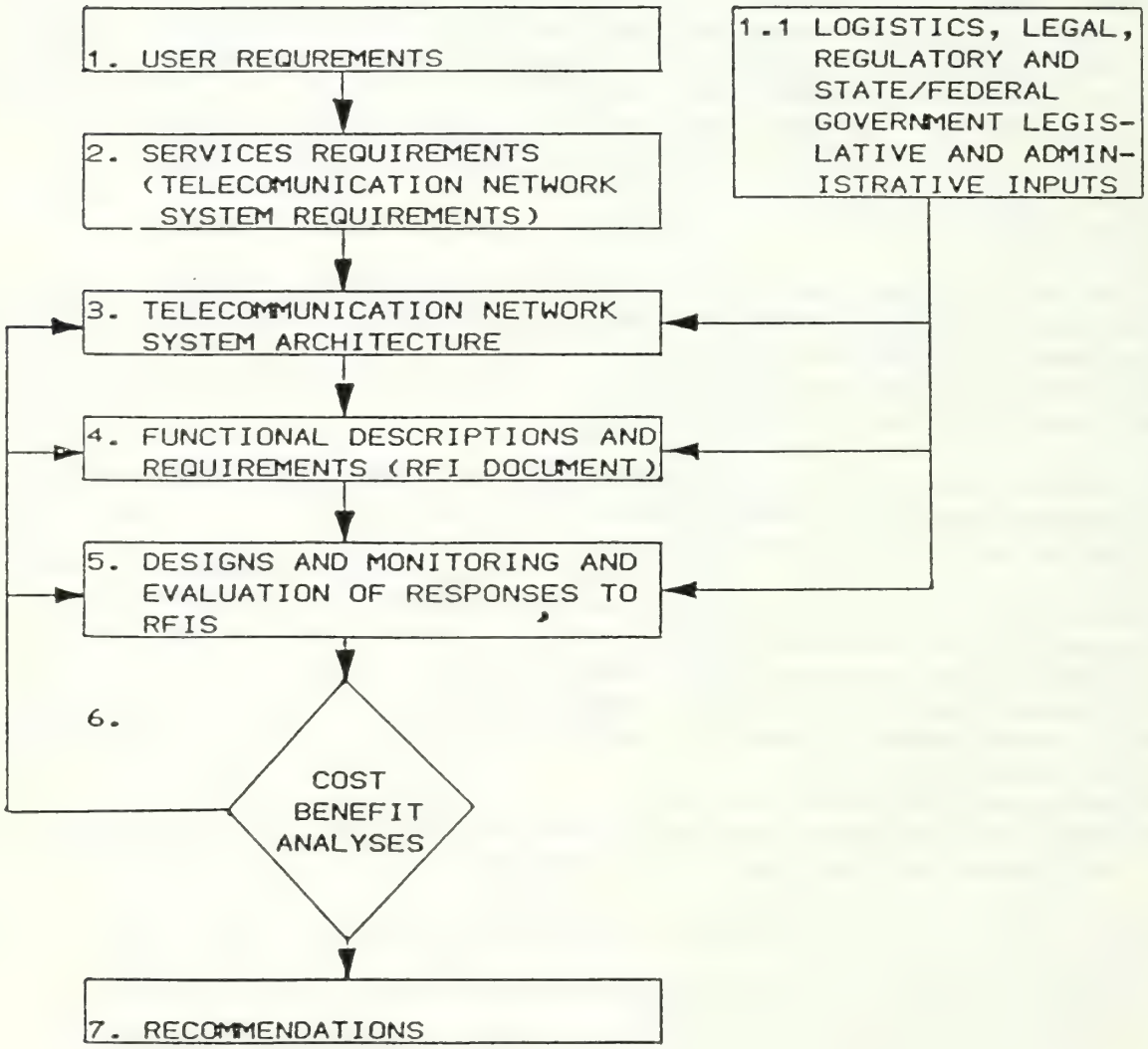
- on-line application related data bases
- specific application program related services
- opportunity to receive specific user defined services
- specialized service order, billing and training services to meet specific user requirements

* Assurance high quality and efficient network system management, operations and administrative functions (including performance monitoring and analyses, service orders, billing, trouble management, and planning functions)
* Cost effective implementation (minimum life cycle cost)
* Minimum initial investment

III. APPROACH

The flow diagram of the approach that can satisfy the objectives of the Phase II DD&O MEED-TN objectives is shown below.

FLOW DIAGRAM FOR THE PHASE II DD&O MEED-TN ACTIVITIES



1. User Requirements

The user requirements document will include several user requirement sets. Each user requirement set will be constructed on the basis of the underlying user application capabilities. For example, a minimum video curriculum capability could consist of: 1) one way video reception on a large screen display, and 2) audio talk back capability at each student's desk. Accordingly, the minimum user requirement set will include this minimum video curriculum application. The minimum user requirement set will in addition include all the minimum underlying user applications that relate to the rest of the minimum educational, health services, industry information gathering and other economic development related capabilities.

It is suggested that at least five sets of user requirements will be generated. These five sets of user requirements would include: 1) a set with a minimum capability, 2) a set with a maximum capability, and 3) three sets between the minimumm and maximum capabilities that increase the minimum capability in roughly equal increments to the maximum capability.

The user requirements will be generated by a working group which will include people from MCET, CNS Corporation and Economics and Technology, Inc.. Each set of user requirements will be described and/or specified in the "User Requirements Document". The User Requirements Document will be a living document which will periodically be updated on the basis of inputs received from: 1) the user community, 2) local and national (or foreign) user application related experts, and 3) from the related technical community. For example, the User Requirements Document will be sent to the appropriate Massachusett (or New England) user communities for their review and comments.

The initial User Requirements Document will be designated as Release 1.0 User Requirements Document. The first minor revision to Release 1.0 will be documented in the Release 1.1 User Requirements Document. Each subsequent minor revision to Release 1.0 will be documented in Releases 1.2 through 1.9. If a major revision is required to Release 1.0 than Release 2.0 User Requirements Document is generated. (Similarly, if major revisions are required to Release 2.0 or to any subsequent (n-1).0 Release, then the corresponding Releases 3.0 through n.0 will be used.) A major revision is considered to be: 1) any one revision that results in a major network system design and/or implementation change, 2) any number of minor revisions (from 1 through 8 revisions) that results in a major network system design and/or implementation change, and 3) nine consecutive minor revisions.

2. Services Requirements

The services requirements document will define (and/or describe):

1. The telecommunication and/or information system services that will be required to satisfy the user requirements.

2. The features associated with the services.

3. The quality of the services (the performance requirements)

4. The management, administrative, and control functions that will be required to deliver and/or enhance the services.

5. The quantity of the services at each location (the location related traffic requirements)

The above described services requirements will be derived from the user requirements. Accordingly, if five sets of user requirements will be defined, then each one of those five sets will provide the basis for deriving the corresponding services requirements set. The services requirements releases and release numbers will correspond to those user requirements from which they will be derived.

Typically the following telecommunication services requirements will be considered:

* Full motion wideband video services:
  - One way (broadcast) with audio talk back
  - Two way video (with two way audio)

* Full motion compressed video:
  - One way (broadcast) with audio talk back
  - Two way video (with two way audio)

* Slow scan (freezed frame) compressed video

* Dedicated data services:
  - 1.2 kbps to 9.6 kbps
  - 19.2 Kbps
  - 56 and 64 Kbps
  - T1 (1.544 Mbps)
  - 1/4T1, 1/3T1, 1/2T1

* Switched data services:
  - 1.2 kbps to 9.6 kbps
  - 19.2 Kbps
  - 56 and 64 Kbps

* Packet switched services

* Switched voice services associated with the data services

* Audio teleconferencing services

3. Telecommunication Network System Architecture

The network system architecture will meet the criteria of Section II, the Objectives Section. On the basis of these criteria the architecture will be capable of accommodating:

* Technology and marketing trends
* Present and future user requirements
* International, federal, North American or recognized industry standards
* Modular implementations
* The provision of the required network system management administration and security services

In addition to the above the architecture will be capable of accommodating all the user and services requirements that will be defined on the bases of Sections 1. and 2. above. The architecture will also be capable of accommodating at least three times the amount of traffic and/or services that will be defined in Section 2. above.

In addition to the inputs received from the above criteria and the user and services requirement sections (Sections 1. and 2. above), the architecture will also comply with the logistics, legal, regulatory and state/federal government legislative and administrative inputs (as shown in the Flow Diagram for the Phase II DD&O MEED-TN above).

4. Functional Descriptions and Requirements (RFI Document)

The purpose of the functional description and requirements activity is to generate RFI (or draft RFP) documents to targeted service providers, integration contractors and equipment and systems vendors. In order to achieve this objective, specific functions associated with a design and/or implementation approach will be allocated to the specific services requirement set(s) and the architecture. These functional allocations in turn will provide the basis for the RFIs and the subsequent designs.

For most part the services requirements document and the architecture can serve as the RFI document (the functional description) for a sevice provider (such as Nynex or SNET) or for an integration contractor (such as Martin Marrieta or Boeing).

For such vendors as microwave and satellite equipment and sytems providers functional descriptions with greater level of detail than the services requirement document and architecture will be reqired. The RFI documents relating to these vendors will have specific functional allocations that will correspond to well defined portions of the services requirements and the architecture. For example, the functions associated with the services (and traffic) requirements of each location will have to be aggregated and allocated to a backbone transmission capability. In this case this transmission capability will be defined in terms of topology and (in some cases) capacities that will be associted with

segments of the suggested topology.

In general, the functional allocations (and descriptions) that will serve as inputs to the RFIs that will be sent to microwave, satellite, switching and other equipment and systems vendors will include the following:

1. Description of the services that the equipment or the system must be able to accommodate

2. Description of the architecture including topology and specific locations

3. Standards and other documentations

4. Logistics, legal, regulatory or other constraints

5. Interface requirements

6. Multiplexing and/or concentration requirements

7. Channelization requirements

8. Capacity (traffic allocation capability) requirement

9. Switching requirement

10. Performance requirements

11. Environmental conditions

12. Power requirements

13. Mechanical (size and shape) requirements

14. Spare parts and maintenance information

The RFIs will be written in such a way that solicitation corresponding to the identified sets of user and services requirements can be prepared.

In addition to the above the Functional Descriptions and Requirements (the RFI Documents) will also comply with the logistics, legal, regulatory and state/federal government legislative and administrative inputs (as shown in the Flow Diagram for the Phase II DD&O MEED-TN above).

5. Designs and Monitoring and Evaluation of Responses to RFIs

This task will include the activities of: 1) network system designs, 2) monitoring of RFIs, and 3) Evaluation of RFIs. The design activity will start with the provision of specific functional allocation related implementation alternatives. Subsequently, on the basis of: 1) the functional allocations, 2) the designated implementation alternatives, and 3) the information

and the responses received from the various service providers, integration contractors and the equipment and systems vendors viable network system designs will be prepared. The network system designs will be capable of accommodating the minimum set of user and services requirements, and at the same time they will have graceful growth capabilities to accommodate the incremental growth requirements of the remaining sets of the user and services requirements. In addition to the above the network system design will also satisfy all the design and implementation objectives of Section II (the Objectives Section). Specifically, the design and implementation alternatives will lend themselves to:

* Satisfaction of present and future user requirements
* Graceful growth capability
* The introduction of such value added enhancements as:
  - increased and high quality services
  - services that would not be otherwise available
  - on-line application related data bases
  - specific application program related services
  - opportunity to receive specific user defined services
  - specialized service order, billing and training services to meet specific user requirements
* Assurance high quality and efficient network system management, operations and administrative functions (including performance monitoring and analyses, service orders, billing, trouble management, and planning functions)
* Cost effective implementation (minimum life cycle cost)
* Minimum initial investment

In addition to the above the Design and Monitoring and Evaluation of Responses to RFIs will also comply with the logistics, legal, regulatory and state/federal government legislative and administrative inputs (as shown in the Flow Diagram for the Phase II DD&O MEED-TN above).

6. Cost Benefit Analyses

For each one of the design solutions the cost of the network will be established. These costs will be derived on the basis of: 1) inputs received from the RFI responses, 2) from the network system integration and implementation cost estimates, 3) and from operational and maintenance cost estimates. In addition for each one of the design and implementation solution the cost will be partitioned to reflect the nonrecurring (investment) and recurring (operational and maintenance) costs. The life cycle (total life time) of each implementation will also be estimated.

For each one of the design solution implementation schedules will be provided. The MCET manpower requirements for the implementation schedules and operation and maintenance activities of each design solution will also be estimated.

On the basis of the above annualized costs (recurring and nonrecurring) and the annual manpower allocations the total annual

costs will be estimated for each design solution.

The benefit that each design solution will be capable of providing will be estimated on the basis of its relative compliance to our user and services requirements. The design and implementation alternatives will be compared with respect to the benefit that each one is capable of providing. The benefits that each design and implementation solution is capable of providing will be expressed via a weight figure. The one with the most benefit will receive the largest weight. The other design and implementation solutions will be weighed relative to largest weight design and implementation solution.

Ratios of cost to benefit numbers will be provided. The design and implementation alternatives with the smallest cost to benefit ratios will be selected.

If the design and implementation solution does not meet the benefit and/or the cost criteria (the user and services requirements and/or the nonrecurring (investment) and recurring operational and maintenance cost criteria) then the design solutions will be iterated via the Architecture and/or Functional Description and/or Design and Implementation steps. (This iterative process is shown in the Flow Diagram for the Phase II DD&O MEED-TN Activities above.)

7. Recommendations

This activity will provide appropriate recommendations for the implementation and for the management, administration and operation of the MEED-TN. These recommendations could include the most desirable solution (for example, the lowest cost benefit ratio solution) and the lowest initial investment solution. In any case the recommendations will summarize the costs and the benefits accrued by selecting our recommended solutions. In fact the recommendations will be used as an important vehicle to receive the appropriate resources to implement a desirable MEED-TN.

IV. DELIVERABLES

The Phase II DD&O MEED-TN activities will have the following deliverables:

1. Release 1.0 User Requirements Document

2. Release 1.0 Services requirements Document

3. MEED-TN Architecture

4. Functional Descriptions (RFI Documents)

5. Release 1.0 MEED-TN Design Alternatives

6. Release 1.0 Cost Benefit Analyses

7. Recommendations (Final Report)

V. SCHEDULES

The Phase II DD&O MEED-TN Schedules are shown in the table below.

PHASE II DD&O MEED-TN SCHEDULES

TASKS		TASK INITION	TASK COMPLETION
1. Task 1.0 :	User Requirements	08/01/87	08/27/87
	Release 1.0 User Requirement Document	08/28/87	09/01/87
2. Task 2.0 :	Services Requirements	08/28/87	10/05/87
	Release 1.0 Services Requirement Document	10/06/87	10/08/87
3. Task 3.0 :	Network System Architecture	09/07/87	10/05/87
	MEED-TN Architecture Report	10/06/87	10/08/87
4. Task 4.0 :	Functional Descriptions	10/06/87	11/19/87
	RFI Documents	11/20/87	11/24/87
5. Task 5.1 :	Phase 1. Designs and Monitoring of RFIs	10/20/87	12/31/87
Task 5.2 :	Phase 2. Designs and Monitoring and Evaluation of Responses to RFIs	01/04/88	03/04/88
	Release 1.0 MEED-TN Design Alternatives Report	03/07/88	03/07/88
6. Task 6.0 :	Cost Benenefit Analyses	02/08/88	03/11/88
	Release 1.0 Cost Benefit Analyses Report	03/14/88	03/16/88
7. Task 7.0 :	Recommendations	03/14/88	04/01/88
	Recommendation (Final Report)	04/04/88	04/08/88
8. Task 8.0 :	Statement of Work for Phase III DD&O MEED-TN Activities	03/28/88	04/08/88

NOTES: It is assumed that:

1. All task completions will be accompanied with a preliminary document and/or report.

2. The preliminary document and or report of each task will be completed one or two days before the task completion dates shown in the table above; the last one or two days of each task will be used for task review.

PHASE II DD&O MEED-TN SCHEDULES (CONT.)

NOTES: It is assumed that:

3. During the review period of each task the preliminary document and/or report of the task will be reviewed and updated for submission to the final document and/or report preparation.

4. The responses to the RFIs will be received within 70 calendar days of the RFI receipt by the service providers, integration contractors and the equipment or the system vendors. (For example, if the RFIs are received (by the respondants) on 12/1/87 then the responses should be received by 2/8/88.)

VI. MANPOWER ALLOCATION

The Phase II DD&O MEED-TN manpower allocations are shown in the table below.

PHASE II DD&O MEED-TN MANPOWER ALLOCATIONS

TASKS		MANPOWER ALLOCATION (IN MAN-DAYS) FOR: MCET and ECONOMICS AND TECHNOLOGY INC.	CNS
1. Task 1.0 :	User Requirements	50	10
	Release 1.0 User Requirement Document	3	
2. Task 2.0 :	Services Requirements	14	18
	Release 1.0 Services Requirement Document	2	
3. Task 3.0 :	Network System Architecture	8	3
	MEED-TN Architecture Report	1	
4. Task 4.0 :	Functional Descriptions	26	26
	RFI Documents	4	
5. Task 5.1 :	Phase 1. Designs and Monitoring of RFIs	24	12
Task 5.2 :	Phase 2. Designs and Monitoring and Evaluation of Responses to RFIs	56	28
	Release 1.0 MEED-TN Design Alternatives Report	4	
6. Task 6.0 :	Cost Benenefit Analyses	45	10
	Release 1.0 Cost Benefit Analyses Report	3	

PHASE II DD&O MEED-TN MANPOWER ALLOCATIONS (CONT.)

TASKS	MANPOWER ALLOCATION (IN MAN-DAYS) FOR: MCET and ECONOMICS AND TECHNOLOGY INC.	CNS
7. Task 7.0 : Recommendations	50	7
Recommendation (Final Report)	4	
8. Task 8.0 : Statement of Work for Phase III DD&O MEED-TN Activities		3

APPENDIX 6

Massachusetts Corporation for Educational Telecommunications

Schedule of Directors and Officers

David C. Knapp, Chairman
President
University of Massachusetts

Richard J. Snyder, Vice Chairman
Managing Partner
Goldstein & Manello, Attorneys

Joseph D. Alviani
Secretary
Economic Affairs

Henry P. Becton, Jr.
President
WGBH Educational Foundation

William M. Cantor
President
E.C. Hilliard Corporation

Jonathan M. Daube
President
Berkshire Community College

Helen A. Donohue
Attorney-at-Law

Franklyn G. Jenifer
Chancellor
Mass. Board of Regents of Higher Education

Allen E. Koenig
President
Emerson College

Lincoln D. Lynch
Superintendent
Middleborough Public Schools

Vincent J. Mara
President
Fitchburg State College

Richard E. Neal
Mayor
City of Springfield

Harold Raynolds, Jr.
Commissioner
State Department of Education

Kenneth G. Ryder
President
Northeastern University

John R. Silber
President
Boston University

Paul A. Tamburello
Justice
Mass. Supreme Court

Charles C. Tretter
General Counsel
New England Governor's Conference

Richard Borten
Executive Director

APPENDIX 7

MINUTES

MASSACHUSETTS CORPORATION FOR EDUCATIONAL TELECOMMUNICATIONS

Meeting of the Board of Directors

Monday, September 15, 1986 - Holyoke, Massachusetts

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The twenty-first meeting of the MCET Board of Directors was called to order at 10:15 a.m. on Monday, September 15, 1986 at Holyoke Community College. Vice Chairman Richard J. Snyder presided in the absence of Chairman Knapp.

Present were: Mr. Snyder, Mr. Bartley, Dr. Ryder, Dr. Koenig, Commissioner Raynolds, Dr. Mara, Ms. Donohue and Executive Director Borten. Also present were Deputy Director Ruth Ferguson, Boston University Vice Provost Dennis Berkey, Attorney Joyce Kirby, Mr. John LeBaron of the Massachusetts Department of Education, Mr. James Corum representing the Executive Office of Administration & Finance, and Mr. Richard Connell of Boston University.

Mr. Snyder informed the Board that Dr. Lynch was absent from the meeting in order to participate in his installation as the President of the New England Association of School Superintendents. The Board rendered an expression of congratulations to Dr. Lynch.

The Minutes of the June 15, 1986 Meeting were approved after being amended to reflect that Dr. Lynch had abstained from voting on the resolutions approved by the Board.

Mr. Snyder introduced and welcomed the following new members of the Board:

Dr. Kenneth G. Ryder, President of Northeastern University
Dr. Allen E. Koenig, President of Emerson College
Harold Raynolds, Jr., Commissioner of Education

Mr. Snyder noted, too, that Dr. Franklyn G. Jenifer, will soon be joining the Board in his capacity as the new Chancellor of the Board of Regents of Higher Education.

The Chairman reported that the Legislature and the Governor have approved a FY 1987 Budget for MCET in the amount of $677,000. (This is the same amount of funding approved for Fiscal Year 1986.)

Mr. Snyder and Mr. Borten outlined the proposed Fiscal Year 1988 Budget, a draft of which had been sent to members of the Board prior to meeting, and answered questions from the members regarding the document. The Board unanimously approved the proposed FY 88 Budget on the motion of Mr. Bartley and the second of Commissioner Raynolds.

Mr. Snyder noted that Chairman Knapp had asked the Executive Committee to review the Corporation's enabling legislation, Chapter 560 of the Acts of 1982, and recommend changes. The Committee considered, in particular, changes which would give a better balance to the Board membership, protect MCET's tax exempt status, and give a more meaningful role to the Advisory Council.

Mr. Snyder and Mr. Borten outlined the Executive Committee's recommendations for amendments to Chapter 560 of the Acts of 1982. The Board unanimously approved Mr. Bartley's motion (seconded by Atty.Donohue and Dr. Koenig):

> To approve the amendatory legislation as recommended by the Executive Committee, provided however, that the Executive Committee modify the language of Amendment F to reflect the Board's intention that all Advisory Committee members represent public interests affected by MCET without enumerating the specific sectors to be represented by the members.

[The amendatory legislation, as recommended by the Executive Committee, is set forth below:]

[Note: Deletions indicated by cross out: e.g., ~~deletion.~~ New language is indicated in **BOLD CAPITAL PRINT.**]

A. **Amendments to Ch.560, Section 3, Paragraph 2**
Changes Board Membership

MCET shall be governed and its powers exercised by a board of directors which shall consist of ~~eighteen~~ **NINETEEN** directors and shall be representative of the racial, ethnic and cultural diversity of the commonwealth, **THE COMMISSIONER OF ADMINISTRATION,** the secretary of economic development and manpower affairs, the commissioner of the department of education, the chancellor of the board of regents of higher education, the president of the University of Massachusetts, the president of the WGBH Educational Foundation, the Chairman of the advisory council of MCET and twelve persons appointed by the governor, three of whom shall be presidents of private institutions of higher education in the commonwealth, one of whom shall be the president of a Massachusetts state college, one of whom shall be the president of a Massachusetts community college, ~~two~~ **ONE** of whom shall be representatives **APPOINTED FROM A LIST OF AT LEAST THREE NOMINEES** of the Massachusetts Municipal Association, one of whom shall be the superintendent of a kindergarten through twelfth grade local public school district in the commonwealth and ~~four~~ **FIVE** of whom shall be bona fide representatives of other major sectors significantly affected by MCET, **INCLUDING REPRESENTATIVES OF BUSINESS, HIGH TECHNOLOGY AND TELECOMMUNICATIONS SECTORS OF THE MASSACHUSETTS ECONOMY.** Each member appointed by the governor shall serve for a term of seven years and thereafter until his or her successor is appointed, except that in making the initial appointments, the governor shall appoint one member to serve for two years, two to serve for three years, two to serve for four years, two to serve for five years, two to serve for six years and two to serve for seven years. Any person appointed to fill a vacancy in the office of a member of the board shall be appointed in a like manner and shall serve for the remainder of the unexpired term. Any appointed member shall be eligible for reappointment, and may be removed from his or her office by the governor for cause. Nine directors shall constitute a quorum and the affirmative vote of the majority of the directors present and eligible to vote shall be necessary for any action to be taken by the board. The directors shall serve without compensation, but shall be entitled to reimbursement for actual and necessary expenses incurred in the performance of their duties. The board shall meet no less than four times each year, and shall have final authority over the activities of MCET.

B. Amendment to Ch.560, Section 3, Paragraph 1

Clarifying MCET's Non Profit Status

There is hereby created a body, politic and corporate, to be known as the Massachusetts Corporation for Educational Telecommunications, hereinafter referred to as MCET. MCET is hereby constituted a **NON PROFIT** public instrumentality of the commonwealth and the exercise by MCET of the powers conferred in this act shall be deemed and held to be the performance of an essential public function. MCET is hereby placed in the University of Massachusetts, but shall not be subject to the supervision or control of said university or of any board, bureau, department, office, or any agency or officer of the commonwealth except as specifically provided in this act.

C. Amendments to Ch.560, Section 5

Protecting MCET's Tax Exempt Status

[Section 5, requiring the establishment of a telecommunications fund and governing the management thereof, would be amended by adding the following paragraph:]

(e) NONE OF THESE FUNDS SHALL BE DISBURSED IN ANY MANNER SO AS TO REVOKE OR OTHERWISE IMPAIR THE STATUS OF MCET AS A NON PROFIT CORPORATION UNDER APPLICABLE PROVISIONS OF LAW.

D. Amendment to Ch.560

Proposed Additional Section Protecting Tax Exempt Status

UPON DISSOLUTION OR LIQUIDATION OF MCET, ALL UNUSED FUNDS AND ASSETS SHALL BE DISTRIBUTED IN ACCORDANCE WITH APPLICABLE PROVISIONS OF MASSACHUSETTS LAWS, CHAPTER 180.

E. Amendment to Ch.560, Section 9

Correcting a Drafting Flaw

No monies shall be credited to the Telecommunications Fund in support of the network unless and until the plan and findings required pursuant to section ~~seven~~ **EIGHT** of this act have been received and approved in writing by the house and senate committees on ways and means.

[Below are the Executive Committee's initial recommendations for language changes to §3, ¶8. As a result of the Board's action, these changes are to be reconsidered:]

F. Amendments to Ch.560, Section 3, Paragraph 8

Changes in Advisory Council

There shall be an advisory council to MCET, which shall consist of no more than ~~twenty-six~~ FIFTEEN members appointed by the governor for terms of ~~seven~~ FIVE years who shall be broadly representative of THE RACIAL, ETHNIC, AND CULTURAL DIVERSITY OF THE COMMONWEALTH AND OF potential providers and users of said network and who are not otherwise represented on the board of directors of MCET, TWO OF WHOM SHALL REPRESENT RECOGNIZED PRIMARY AND SECONDARY SCHOOL TEACHER LABOR ORGANIZATIONS IN MASSACHUSETTS , ONE OF WHOM SHALL REPRESENT THE MASSACHUSETTS BOARD OF LIBRARY COMMISSIONERS, ONE OF WHOM SHALL REPRESENT A COLLEGE OR SCHOOL OF MEDICINE IN THE COMMONWEALTH, ONE OF WHOM SHALL REPRESENT A COLLEGE OR SCHOOL OF EDUCATION IN MASSACHUSETTS, ONE OF WHOM SHALL REPRESENT THE MASSACHUSETTS BAR ASSOCIATION, ONE OF WHOM SHALL BE A LICENSED NURSE ACTIVELY PRACTICING IN MASSACHUSETTS, TWO OF WHOM SHALL BE MEMBERS OF THE ENGINEERING FACULTIES OF INSTITUTIONS OF HIGHER LEARNING IN THE COMMONWEALTH, TWO OF WHOM SHALL REPRESENT ACCREDITED HOSPITALS IN MASSACHUSETTS, AND FOUR OF WHOM SHALL BE BONA FIDE REPRESENTATIVES OF OTHER SECTORS AFFECTED BY MCET. THE COUNCIL SHALL EVALUATE THE TELECOMMUNICATIONS NEEDS OF VARIOUS SECTORS OF THE COMMONWEALTH AND RECOMMEND TO THE MCET BOARD OF DIRECTORS PROGRAMS AND ACTIVITIES DESIGNED TO SERVE THOSE NEEDS. The council shall meet no less than three times a year and shall annually elect a chairman from among its membership. EIGHT MEMBERS OF THE ADVISORY COUNCIL SHALL CONSTITUTE A QUORUM.

Mr. Richard Connell, assistant to Treasurer Charles Smith, reported on the annual audit prepared by MCET's accounting firm, KMG Main-Hurdman. Mr. Connell reported that MCET had total assets at the end of FY 1986 of $268,911 and cash assets of $247,477. He noted, however, that the auditor's report contained an important factual error (stating that MCET is "at the present time, not an instrumentality of the Commonwealth") and would be returned for correction. [Corrected copies will be mailed to the Board.]

Main-Hurdman has advised us that the US Internal Revenue Service investigator working on the Corporation's request for a formal confirmation of MCET's tax exempt status has recommended favorable action.

Executive Director Richard Borten reported that a joint U.S. House/Senate Conference Committee is expected to act on an amendment to the Higher Education Act authorizing funding for network development within the next two weeks. Should approval of the amendment be successful, hearings on an actual appropriation could take place between February and April. Early appropriation bills are signed in June, July or August, but could be put off until September or October 1987. Mr. Borten said that Cassidy & Associates is also exploring the possibility of seeking an early supplementary appropriation bill for the federal Fiscal Year beginning October 1, 1986; if this is possible, funding could arrive next summer.

Mr. Borten stated that MCET has been unable to obtain additional space in the McCormack state office building and the Corporation long ago outgrew its approximately 740 square foot office. Lack of space has prevented MCET from hiring necessary personnel and has affected staff morale. Mr. Borten has been advised that no space is available in the McCormack, Saltonstall or Hurley state office buildings and, therefore, has begun looking for reasonably priced space in commercially owned buildings. After looking at fifteen buildings and having received proposals from 5 building owners, the most appropriate spaces appear at this time to be 205 Portland Street, Boston (renting at $18 per square foot annually plus heating, ventilation and air conditioning) and the Boston World Trade Center (renting at $20 per square foot annually including one parking space per 1000 square feet rented).

On the motion of Mr. Bartley, seconded by Dr. Mara, the Board unanimously approved the following resolution:

> VOTED: In accordance with sections 3 and 4 of Chapter 560 of the Acts of 1982, to authorize the Executive Director on behalf of MCET to negotiate and execute an agreement for the lease of not more than 3,000 square feet of office space for the purpose of housing the administrative offices of MCET. Said lease shall be for a term not to exceed three years, and in an amount not to exceed $24.00 per square foot per year, provided, however, that such lease agreement shall be made subject to the availability of funding.

Mr. Borten reported that since the last Board meeting, MCET has completed a pilot project on behalf of the Massachusetts Commission for the Blind. The audio conference originated at the State House and was transmitted to meeting sites in Marshfield and Springfield, as well as to audio receivers owned by blind listeners throughout the state. Governor Dukakis, Senate President Bulger and Cardinal Law participated in the conference.

The Executive Director noted that on September 22, MCET will coordinate the transmission for a teleconference sponsored by the Governor's Office. The conference will originate at UMass-Boston where Gov. Dukakis will lead discussions on technical innovation in the Commonwealth and will be transmitted to participants in Amherst, Worcester and South Dartmouth. Participants at the remote sites will be able to ask questions and make comments via an audio-conferencing system.

Four additional Pilot Projects are planned for implementation this fall:

- The Physics Forum - aimed at high school physics teachers and sponsored by the Physics Department at UMass/Amherst;
- HealthNet - A continuing education program for medical professionals originating at University Medical Center and transmitted to various health care facilities;
- Pediatric Grand Rounds - A continuing education program for pediatric professionals originating at New England Medical Center and transmitted to hospitals in Fall River, Salem and Springfield; and

- Public Policy Forums - an educational series for public managers sponsored by the Institute for Governmental Services and to be received at meeting sites in Cambridge and Springfield.

Mr. Borten stated that he had frozen management salaries at MCET last year and that Deputy Director Ruth Ferguson had not had an adjustment in her pay since 1984. The Board approved Mr. Borten's recommendation that Ms. Ferguson's salary be increased by 9 percent.

The Executive Director reported that the law firm with which MCET has contracted for matters relating to the Federal Communications Commission is about to disband as a result of retirements. The attorney who has handled MCET's needs is transferring to the firm of Heron, Burchette, Ruckert and Rothwell. On the motion of Mr. Bartley, seconded by Dr. Ryder, the Board unanimously:

VOTED: In acccordance with sections three and four of Chapter 560 of the Acts of 1982, to authorize the Executive Director on behalf of the Massachusetts Corporation for Educational Telecommunications to terminate the currently operative consultant contract with McKenna, Wilkinson and Kittner, effective September 30, 1986, and in place therof enter into a contract with Heron, Burchette, Ruckert and Rothwell under the same terms and conditions, for the purpose of providing advice and legal counsel in specialized telecommunications matters pending before the Federal Communications Commission or other appropriate entity during the period October 1, 1986 through June 30, 1987, in an amount not to exceed $15,000 (inclusive of all payments made to McKinna, Wilkinson and Kittner during the 1987 Fiscal Year), provided that such contract shall be made subject to the availability of funding.

As a result of Dr. Duff's resignation from the MCET Board, the Executive Director reported, there is a need to change the authorized signatories for the MCET Development Trust Fund account at the State Street Bank & Trust Company. On the motion of Mr. Bartley, seconded by Commissioner Raynolds, the Board:

RESOLVED: That State Street Bank and Trust Company, Boston, Massachusetts, (hereinafter called the Bank), its successors or assigns, be and hereby is designated a depository of this corporation, and is authorized and directed to pay and to charge to the account of this corporation without limit as to amount and without inquiry as to circumstance of issue or disposition of the proceeds, even if drawn or endorsed to any signing or endosing officer of other officer of this corporation or tendered in payment of the individual obligation of any such officer or for his credit or for deposit to his personal account, any and all checks,

drafts, notes, bills of exchange, acceptances, or other orders for the payment of money upon the Bank, its successors or assigns, or payable at the office thereof and signed on behalf of this corporation by any one (1) of its following officers, to wit:

Chairman of the Board of Directors
Executive Director

RESOLVED: That the Secretary or Clerk of this corporation be and hereby is authorized to certify to State Street Bank and Trust Company, its successors or assigns, that these resolutions have been duly adopted and that they are in conformity with the Charter and By-Laws of this corporation and shall remain in full force and effect until notice in writing or revocation or modification signed by the Secretary or Clerk of this corporation be delivered to said Bank.

Noting that the Executive Director's performance and salary have not been reviewed by the Board in two years, Mr. Snyder reported that the Executive Committee had conducted such a review last week, had recommended an increase of fifteen percent, and had so advised Mr. Borten. The Chairman further advised that Mr. Borten has requested a nine percent increase, which is the equivilent of last year's management pay adjustment for cost of living and merit in public higher education. The Board adopted Mr. Borten's request with the understanding that it wishes to review his salary again in July 1987 after the current negotiations relating to public higher education management salaries for 1987 are completed.

The meeting was adjourned at 11:50 a.m.

The next meeting will be held on Monday, December 15, 1986 in Boston.

THE COMMONWEALTH OF MASSACHUSETTS

CORPORATION FOR EDUCATIONAL TELECOMMUNICATIONS

McCormack Building / One Ashburton Place / Boston, MA 02108 / (617) 727-6286

MINUTES

Massachusetts Corporation for Educational Telecommunications

MEETING OF THE BOARD OF DIRECTORS

Monday, December 15, 1986 - Boston

§

The 22nd meeting of the MCET Board of Directors was called to order by Chairman David C. Knapp at 10:10 a.m.

Present were: Dr. Knapp, Mr. Snyder, Dr. Lynch, Dr. Daube, Mr. Cantor, Dr. Koenig, Mr. Becton, Mr. Tretter, Commissioner Raynolds, Executive Director Borten, and Board Secretary Samels.

Also present: Dr. Jones, representing Dr. Silber; Ms. Kryczka, representing Dr. Ryder; Ms. Jones representing Secretary Alviani; Dr. DeNike representing Dr. Mara; Atty. Kirby of the Board of Regents legal staff; Mr. Corum representing the Executive Office of Administration & Finance; Mr. Connell representing Treasurer Smith; Mr. Cronin of WGBH; Mr. LeBaron of the Bureau of Educational Resources; Mr. Crain of UMass; Ms. Ferguson of MCET; and Mssrs. Orloff and Versage of Cassidy & Associates, Inc.

On the motion of Dr. Lynch, seconded by Dr. Daube, the Minutes of the September 15, 1986 meeting were unanimously accepted.

Chairman Knapp reported that the Executive Committee met on December 5, 1986 to address the need for changes in legislative strategy and other business. He noted that the Executive Committee ratified the Board's authorization for the executive director to negotiate and execute an agreement to lease office space, and that the Committee ratified the Board's resolutions to amend Chapter 560 (MCET's enabling legislation) by:

- Increasing the size of the Board of Directors from 18 members to 19 members; adding the Commissioner of Administration; and altering the Board's membership to include business, high technology and telecommunications industry representatives; and by
- Correcting a drafting flaw in the statute.

The Chairman noted that the Executive Committee also deleted three amendments relating to MCET's tax status as a result of a change in circumstances. In September the Board believed the changes approved in Resolutions identified as "B," "C," and "D" were needed to enhance our chances of obtaining a favorable Internal Revenue Service ruling on our non-profit status. Shortly after the meeting the Corporation was notified of a favorable IRS ruling, making the changes unnecessary.

The Executive Committee, in accordance with the Board's request, re-drafted the Resolution considered at the September meeting changing the composition of the MCET Advisory Council and defining its role. The new language, in accordance with the Board's request, reduces the number of categories to be represented on the Advisory Council. The Executive Committee ratified the amended Resolution.

Dr. Knapp explained that the Executive Committee took these actions because the filing deadline for legislation occurred prior to the meeting of the full Board.

Chairman Knapp stated that at the Executive Committee meeting, Dr. John R. Silber raised the possible need for legislation protecting Board members from unreasonable charges of conflict-of-interest. Dr. Knapp stated his belief that the best course of action on this issue is to re-constitute the Committee on Conflicts which examined similar issues in the past. Dr. Knapp appointed Secretary Joseph D. Alviani to chair this committee, which was formerly chaired by his predecessor, and asked Dr. Silber, Dr. Koenig, Mr. Snyder and Commissioner Raynolds to serve as members. The Chairman advised that, if necessary, the Committee should again call on MCET's outside counsel for assistance.

Chairman Knapp reported that the legislative Resolutions ratified by the Executive Committee were filed last week. Senate Majority Leader Walter Boverini was principal sponsor of the legislation, which was co-sponsored by Senators Olver and Albano, along with Representatives Rosenberg and Menard.

The Chairman noted that at the September meeting the Board approved a FY 1988 budget request in the amount of $939,598. MCET, like most other organizations subject to the budget process, has heard that its request may be cut significantly. Chairman Knapp asked A&F representative James Corum if he could provide any additional information. Mr. Corum stated that no final budget figures have yet been released, but that most agencies should anticipate "level" funding.

The Chairman noted that MCET's By-Laws stipulate the March meeting as the Corporation's annual meeting for all purposes, including the election of officers and that the By-Laws require the Chairman appoint a nominating committee three months prior to the annual meeting. Chairman Knapp appointed Mrs. Donohue, Mr. Snyder, and Sec. Alviani to constitute such a committee and recommend a slate of candidates for officer and Executive Committee positions at the next meeting.

The Executive Director reported that he has orally committed to leasing 2,942 square feet of office space at the World Trade Center on Commonwealth Pier. The rental package includes three parking spaces, along with maintenance, heat, air conditioning and ventilation. Rent for the space is $20 per square foot and the landlord provides a "build-out" allowance of $17 per square feet. (Normally the World Trade Center rents waterfront space at $22 per square foot.) The proposed lease is currently under legal review, and the staff is aiming at a mid-March move-in date.

With a quorum now present at the meeting, the Board ratified the acceptance of the Minutes of the September meeting and unanimously approved the following resolution moved by Dr. Daube and seconded by Mr. Becton:

VOTED: In accordance with sections 3 and 4 of Chapter 560 of the Acts of 1982 to delegate to the Executive Director acting on behalf of the Corporation to expend funds in an amount not to exceed $20,000 for the purpose of establishing, furnishing and equipping the MCET offices at the World Trade Center pursuant to the Board's September 15, 1986 vote authorizing a lease at that location.

Mr. Borten reported that he has dropped Alexander & Alexander as MCET's insurance agent, expressing disappointment in the firm's lack of aggressiveness in seeking Director's & Officer's Liability insurance. He has asked the firm of Johnson & Higgans to contact all possible carriers in an effort to secure such coverage. The staff is also working with a consortium of independent state authorities, including MIFA, the Community Development Finance Corporation, etc., in exploring group liability coverage.

Dr. Lynch suggested that Mr. Borten check with the Massachusetts Association of School Business Officials , which has also sought group coverage.

The Executive Director reported that MCET and WGBH have reached agreement on terms and conditions for MCET's lease of capacity on the House/WGBH Intercity Relay System at a rate of $100 per hour. We are awaiting WGBH's execution of the agreement.

Mr. Borten reported in detail on the MCET pilot projects completed to date, noting that a 9th pilot project (with participation by Board members David Knapp, David Bartley and Mayor Richard Neal, along with Congressman Joseph Early) will be implemented on December 16, 1986.

The projects, which utilize existing capacity, are designed to:

- Test demand for the delivery of educational services via telecommunications;
- Determine the costs of delivering educational services via telecommunications;
- Provide institutions with initial opportunities to experiment with the use of telecommunications; and
- Develop staff skills.

Unfortunately, because the use of leased existing capacity limits our ability to reach all parts of the state, and because the costs of leased facilities is far different from using owned capacity, the pilot projects cannot tell us everything we want to know. However, the projects have enabled us to reach many of the sectors and geographic areas we hoped to reach, and have been extremely successful in terms of:

- Technical performance;
- Achieving our clients' educational/communications goals;
- Obtaining very positive responses from clients and participants; and
- Exposing many institutional and government leaders to telecommunications.

Independent evaluations of the pilot projects prepared by the Lincoln-Filene Center have been most encouraging. Almost 90% of participants in last project* rated it as good or excellent compared to traditional meetings. Also very successful in enabling MCET to develop relationships with sources of capacity, the Projects have entailed the use of capacities owned by:

- Northeastern University, Boston Catholic TV, etc. (ITFS);
- Cable systems in more than 6 cities & towns (none of which have charged usfor the use of such capacity to date);
- The SportsChannel's microwave and satellite transmitting systems;
- New England Sports Network -
- Multi-Link Audio Bridge
- WGBH - House/WGBH Intercity Relay System

Mr. Borten said he sees the Pilot Projects as MCET's most tangible successes to date, but the Corporation must pursue further outreach to potential MCET clients and supporters. He noted that the Projects tend to reach programmers (those institutions that want to produce and sell programming), but do not help build strong relationships between MCET and potential "receivers" or program purchasers. We need to develop such relationships and gain a better understanding of how schools and industry will make educational programming purchasing decisions.

The Executive Director said he sees the proposed restructuring of the Board as a step that can help build a stronger relationship with industry; he also noted that the staff has intensified its efforts to meet with relevent business and educational leaders, and that MCET is preparing a Corporation for Public Broadcasting/Annenberg Grant application for support of a teleconference series aimed at enabling institutional leaders to understand what is involved in the distribution of programming via telecommunications. Mr. Borten also reported that he is preparing a marketing/outreach plan for the review of the Executive Committee. However, he stressed the need for Board member assistance in building relationships with industry, schools and other program purchasers.

*"Right-to-Know Teleconference"

In this context, Mr. Borten thanked Dr. Lincoln Lynch for his role in securing an endorsement from the New England School Superintendents' Association for MCET's network proposal.

Chairman Knapp called on Mr. Vincent Versage and Mr. Jonathan Orloff of Cassidy & Associates to provide the Board with a report on the firm's work on behalf of MCET to date and a perspective on what can be expected in the upcoming Congressional session.

Mr. Versage explained that MCET's federal funding proposal, prepared last spring, was a central tool in Cassidy & Associates' efforts to educate the Massachusetts delegation and other key members of Congress. Another important aspect of the past year's efforts was the trip to Washington by representatives of MCET's Board. Several key supporters for the federal funding efforts were brought on board at that time, including Senator Kennedy and Congressmen Atkins and Moakley.

Mr. Versage discussed the two courses MCET pursued for obtaining funding authorization language during the last Congressional session (i.e., the inclusion of such language in the Higher Education Reauthorization Bill, and the addition of language to the House Trade Bill). While neither effort was ultimately successful in 1986, our supporters in Congress were able to obtain assurances from key members of the Education Committee for support of the MCET proposal in the coming year.

Mr. Orloff predicted that the climate for education-related policy making will change in the coming year, due to the new Democratic majority in the Senate. While last year's efforts for MCET started relatively late in the legislative calendar and were in effect an "add-on" to other issues, Mr. Orloff believes that this year MCET's proposal will play a more central role within the agendas of the House and Senate Education Committees.

According to Mr. Orloff, Senator Kennedy plans to take an aggressive posture in the education sub-committee, and is considering making MCET a key component of his agenda for 1987.

There was some discussion of the likely vehicles for funding the MCET proposal, including the reauthorization of elementary and secondary education bill or the omnibus trade bill.

Mr. Orloff then told the Board of a proposed demonstration project that Senator Kennedy is interested in hosting. As currently envisioned, the project would entail the Senator acting as "professor," teaching a class in politics, probably discussing the agenda for the Democrats in the next Congress. The project will be a two-way video teleconference to selected high schools and colleges in Massachusetts.

Cassidy & Associates will provide a written report to the Board within . the coming weeks.

There being no additional business, the meeting was adjourned at 11:20 a.m.

[THE NEXT MEETING WILL BE ON MARCH 16, 1987.]

MINUTES

ANNUAL MEETING OF THE MCET BOARD OF DIRECTORS

10 a.m. - Monday, March 16, 1987
McCormack State Office Building, Boston, Massachusetts

I. Call to Order

The twenty-third meeting of the MCET Board of Directors (and 1987 Annual Meeting) was called to order by Chairman David C. Knapp at 10:05 a.m.

Present were: Dr. Knapp, Mr. Bartley, Mr. Becton, Dr. Daube, Atty. Donohue, Dr. Koenig, Dr. Lynch, Dr. Mara, Commissioner Raynolds, Mr. Snyder, Atty. Tretter, Executive Director Borten and Secretary Samels.

Also Present: Richard Connell and Provost Jon Westling of Boston University; Kevin Crain of the University of Massachusetts; Ruth Ferguson of MCET; Megan Jones of the Executive Office of Economic Affairs; Atty. Joyce Kirby of the Board of Regents; John LeBaron of the State Department of Education; Vincent Versage of Cassidy & Associates, Inc.; and Ray Williams of Northeastern University.

II. Acceptance of Minutes

The Minutes of the December 15, 1986 meeting of the Board were unanimously accepted on the motion of Dr. Daube and the second of Commissioner Raynolds.

III. Report of the Chairman

Chairman Knapp, in reporting on MCET's Fiscal Year 1988 Budget, noted that MCET's $939,598 request was reduced to $677,000 in House 1, the Governor's budget recommendation to the Legislature. This is MCET's third consecutive year of "level funding" at $677,000. (In FY 86 only $407,500 of the full appropriation was released; the entire amount was released for the current fiscal year.)

The House Ways & Means Committee began hearings on March 12 on the higher education portion of the budget, and will deal with MCET's budget when it re-convenes on March 26th.

Dr. Knapp noted that the three bills filed by MCET with the Legislature to amend our enabling statute will be heard by the Joint Education Committee on March 31, 1987. Members of the Board were urged to support these bills as they move through the legislative process.

The Chairman reported that a great deal of progress concerning our federal funding efforts has occurred since the December Board meeting. Speaker Wright has re-introduced the Trade Bill in the House, including language inserted in last year's version of this bill by Congressman Atkins which provides funding for an educational telecommunications network.

Dr. Knapp noted that he addressed the US Senate's Committee on Labor and Human Resources Committee January 14 concerning the benefits of using telecommunications to enhance educational opportunity. MCET subsequently helped set up a hearing called by Senator Kennedy, Chairman of the Committee, on February 27th at Bunker Hill Community College. At that hearing, Kennedy announced his intention to file a bill funding the development of regional telecommunications networks around the country, including one in New England to be developed by MCET. MCET's goals were also discussed at a March 11th hearing of the Committee held in Washington.

Chairman Knapp thanked Dr. Lincoln Lynch, along with Dr. Russel Jones of Boston University, and John LeBaron of the Department of Education, for their testimony at the Bunker Hill Community College hearing.

Dr. Knapp called on Vincent Versage of Cassidy & Associates to provide a more detailed report on progress in Washington. Mr. Versage noted that Cassidy & Associates and Sen. Kennedy's staff are working with Senators Pell of RI, Stafford of Vermont and Thurmond of South Carolina to gain support for the measure. He expressed hope that the legislation would provide $20-$25 million in support for an MCET network.

Mr. Versage indicated that his office is also working with Congressman Moakley, who is approaching network development funding though the House Trade Bill, which could be merged with Senator Kennedy's measure.

IV. Reports of the Committees

A. Committee on Conflicts of Interest

In the absence of Secretary Alviani, Mr. Snyder gave the Report of the Committee on Conflicts (comprised of Sec. Alviani, Dr. Koenig, Cmr. Raynolds, Dr. Silber and Mr. Snyder). The Committee met on February 20, 1987 to review concerns raised by Dr. Silber with respect to the protection of Board members from unreasonable charges of conflict-of-interest in discharging their duties as MCET Board members.

The Committee discussed the legal effect of the disclosure and non-participation requirements contained in Section 3 of MCET legislation, which incorporates by reference the State Conflict of Interest Law, and the applicability of these statutory provisions to certain hypothetical factual situations involving the Corporation's Directors and their respective institutional, organizational or other affiliations.

The Committee reviewed alternative methods of clarifying the operative provisions of these statutes and recommending, if appropriate, curative legislation, by-laws, codes of conduct or other legally appropriate means for resolving the questions raised by these statutory provisions. The Committee also voted unanimously to authorize the Executive Director to retain the services of Attorney Thomas E. Kiley to address these charges to the Committee and file a report no later than April 15, 1987.

B. Nominating Committee

Nominating Committee Chairman Richard Snyder reported that the Nominating Committee (comprised of Mr. Snyder, Mrs. Donohue and Mr. Alviani) recommended the election of the following officers:

Chairman:	David Knapp
Vice Chairman:	Richard Snyder

The Committee also recommended a By-Law Change increasing the size of the Executive Committee from five to six members and nominated the following Board members to serve on the Executive Committee (along with the Chairman and Vice Chairman):

- Joseph D. Alviani;
- John R. Silber;
- Helen A. Donahue; and
- Kenneth G. Ryder.

The Committee further recommended that the following officers be appointed

- Treasurer: Charles Smith
- Secretary: James Samels

Dr. Mara moved and Mr. Bartley seconded the following resolution (to be ratified at the June 1987 meeting) increasing the size of the Executive Committee:

> MOVED: That Article V Section 1 of the By-laws of the Massachusetts Corporation for Educational Telecommunications be amended by deleting the word "three (3)" before "Directors" and inserting "four (4)" so that the first sentence of that section reads "The Chairman, Vice Chairman and four (4) Directors elected by the Board of Directors at the annual meeting of the Board shall constitute the Executive Committee of the Board . . ."

On the motion of Dr. Mara, seconded by Mr. Bartley, the recommendations of the Nominating Committee for the election of Chairman, Vice Chairman and members of the Executive Committee, along with the appointment of the Secretary and Treasurer were unanimosuly accepted.

V. Report of the Executive Director

The Executive Director reported that on or about April 1, MCET will move its offices from the McCormack Building to the World Trade Center, Commonwealth Pier, Boston. MCET's new address and telephone number are:

Massachusetts Corporation
for Educational Telecommunications
Suite 115
World Trade Center
Boston, Massachusetts 02210
Telephone (617) 439-5888

Mr. Borten noted that due to an error by the World Trade Center's planners, the square footage of the space we have agreed to rent has been increased from 2,942 to 3,065 square feet. In order to compensate us for their error, the World Trade Center will waive rental charges for the first three months. Therefore, under the new terms, the total rent payment for the three year lease will be $7945 less than under the original terms.

However, because the Board approved leasing no more than 3,000 square feet, the Executive Director requested approval of the following resolution:

> MOVED: In accordance with applicable provisions of Sections 3 and 4 of Chapter 560 of the Acts of 1982, to approve and ratify the execution of an agreement for the lease of 3,065 square feet of office space with the World Trade Center the terms of which are specifically set forth in Exhibit A attached hereto and entitled "Standard World Trade Office Center Lease."

The resolution was unanimously approved on the motion of Dr. Daube, seconded by Mr. Snyder.

Mr. Borten stated that MCET continues to aggressively explore Directors and Officers Liability Insurance Coverage for the Board. Unfortunately, four additional applications for coverage have been declined, but we await word from the two remaining commercial companies. According to MCET's broker, a number of new companies are seriously considering entering the liability field.

Deputy Director Ruth Ferguson has also met with other quasi-public agencies facing similar difficulty in acquiring Directors & Officers Liability Insurance. The quasi-publics have been working on two fronts:

a. Filing legislation which would immunize non-compensated directors of quasi-publics from liability, and would allow directors to purchase liability insurance for directors, officers and employees and indemnify said individuals.

b. Considering the possibility of joining forces to establish an insurance pool to supplement every quasi-public authority's coverage.

Finally, we are applying for D&O insurance through SCUUL - School, College and University Underwriters, Ltd - a Bermuda-based "captive" insurance company developed by Marsh and McLennan, Inc. and Morgan Guaranty Trust Co. of New York with the National Association of College and University Business Officers. But our eligibility for coverage under this program is uncertain.

Dr. Koenig suggested that the staff also explore efforts undertaken by the Association of Independent Colleges and Universities of Massachusetts (AICUM) regarding the problem of Directors & Officers Liability Insurance.

Mr. Borten reported that MCET has completed a number of pilot projects since the last meeting and is anticipating the implementation of several more:

Public Policy Forum - (Part II) took place on Dec. 16, 1987, and was sponsored by the Instititute for Governmental Services. The 2-way video conference between Cambridge and Springfield provided elected and appointed government officials with information on the "Changing Nature of Federal Funding." (Total Cost $2,200; MCET cost $1,000)

The first two sessions of the Health Net conference, sponsored by the Area Health Education Center (AHEC), were conducted on February 27 and March 13, 1987. Further sessions are scheduled for April 10, 24, May 1 and 15. The 1-way videoconference with audio return is aimed at MDs and nurses participating at eight health centers in Lawrence, Peabody, Watertown, Quincy, and Springfield. (Total cost $15,000; MCET cost $9,000)

Confronting AIDS on Campus - is sponsored by the Mass. Dept. of Public Health and will be implemented on April 8, 1987. The 1-way video transmission with audio return to Amherst, Boston, Southeastern Massachusetts, Northern Essex Community College, Western New England College and a site to be selected in Worcester is aimed at Mass. college and university officials. (Total cost $6,900; MCET cost $5,000)

AIDS Awareness in Secondary Schools - Is also a 1-way video conference with audio return sponsored by the State Dept. of Public Health. The April 28, 1987 transmission will be aimed at high school teachers participating at seven college sites (UMass-Boston, SMU, Mt. Wachusett Community College, Western New England College, Berkshire Community College, and two yet-to-be-determined sites in Central and Northeastern Massachusetts.
(Total cost - $8,200; MCET cost - $3,400.)

Invisible Experiences - Sponsored by the Boston University Center for the Study of Communication and the Deaf, and the Deaf Media Coalition, is scheduled for all day on May 8, 1987. 1-way video with audio return to 5 sites in Worcester, Boston, Dartmouth, Northern Essex County, and Springfield. The transmission will be aimed at parents of deaf children. (Total cost $5,800; MCET cost $2,400.)

The Math Network - Sponsored by Harvard Graduate School of Education will be implemented on May 12, 1987. A national teleconference with 1-way video and telephone return communications, the project is aimed at college and university administrators and development officers. (Total cost - $2,800; MCET cost $1,500)

Noting that only Linda DiRocco of the MCET staff is available to plan and implement pilot projects, Mr. Borten said he anticipates the need to hire a Projects Service Coordinator at a salary of $22,000 within the next few weeks. On the motion of Mr. Bartley and the second of Dr. Mara, the Board approved such hiring subject to the availablity of funds.

VI. Other Business

Dr. Lynch moved that the staff seek to expand congressional support for the funding of equipment needed by schools to make effective use of voice, data and video communications. The motion was seconded and approved.

Dr. Koenig suggested that MCET invite members of the Legislature's Joint Committee on Education to meet with the Board at the next meeting for approximately one hour.

VII. Adjournment

There being no other business, the meeting was adjourned at 10:55.

The Next Meeting will be in Boston on

MONDAY, JUNE 15, 1987

M I N U T E S

Meeting of the Board of Directors
Massachusetts Corporation for Educational Telecommunications
10 a.m., Monday, June 15, 1987, World Trade Center

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1. Call to Order

The Twenty-fourth meeting of the MCET Board of Directors was called to order by Chairman David C. Knapp at 10:05 a.m.

Present were: Dr. Knapp, Mr. Cantor, Dr. Daube, Dr. Jenifer, Dr. Koenig, Dr. Lynch, Commissioner Raynolds, Dr. Ryder, Dr. Silber, Atty. Snyder, Executive Director Borten and Secretary Samels.

Also present were: Dennis Berkey and Dick Connell of Boston University; Lee DeNike of Fitchburg State College; Abbie Goodman of MCET; Barbara Waters of the Executive Office of Economic Affairs; John LeBaron of the State Department of Education; and Vincent Versage of Cassidy and Associates, Inc.

2. The Minutes of March (1987 Annual) Meeting were approved.

3. Report of the Chairman

A. FY 88 Budget - Dr. Knapp reported that the Governor's, the House of Representatives' and the Senate's versions of the state budget each propose funding MCET at $677,000 (level funding).

B. Progress of MCET's Legislative Package

The Chairman reported that S.221 (correcting a drafting flaw in Ch. 560) was approved by the legislature and signed into law by the Governor to become effective on September 1, 1987 (as Chapter 110 of the Acts of 1987). S.222 (changing the membership and role of the Advisory Council) was also approved by the Legislature and signed into law by the Governor to become effective on September 1, 1987 (as Chapter 111 of the Acts of 1987).

S.220 (changing the membership of the MCET Board of Directors) is currently in the Committee on Ways & Means where it is likely to remain until after the Senate releases its budget and turns to other business.

C. Progress on Federal Funding Efforts

Dr. Knapp noted that since the last meeting, Senator Kennedy's Star Schools legislation has been filed and approved by an overwhelming bi-partisan vote of the US Senate. It has also been introduced in the House by Representative Moakley.

The Chairman called on Mr. Vincent Versage of Cassidy & Associates to provide a more detailed briefing on progress towards acquiring federal funding for network development. Mr. Versage summarized a written report, which he prepared and distributed at the meeting [copy enclosed].

4. Report of the Executive Committee

The Chairman noted that the Executive Committee met on June 8, 1987 at which time it received and approved the report of the Committee on Conflicts, which he called upon Committee member Richard Snyder to summarize in the absence of Committee Chairman Alviani.

A. Report of the Committee on Conflicts:

Mr. Snyder reported that at its June 3, 1987 meeting, the Committee on Conflicts unanimously voted to receive the April 15, 1987 Report on Conflicts prepared by Attorney Thomas R. Kiley (Kiley Report) and to authorize the Executive Director to take all necessary action to carry out the recommendations set forth in the Kiley Report, which may include, but shall not be limited to:

(a) The retention of Attorney Kiley as Special Conflicts Counsel for an amount not to exceed $6,000;

(b) The filing of an advisory opinion request with the State Ethics Commission;

(c) The promulgation of standards of conduct governing MCET directors regarding issues of potential conflict;

(d) The exhaustion of all remedies at law including the instigation of litigation seeking declaratory relief from a court of competent jurisdiction; and/or

(e) The filing of appropriate legislative amendments to the State Conflict-of-Interest Law.

At the close of the Committee's deliberations, it was requested that the Executive Director prepare and distribute a progress report regarding the resolution of this matter to the directors on or before the next regularly scheduled meeting of the Board on September 21, 1987.

Chairman Knapp stated that the Executive Committee had voted to accept the recommendations of the Committee on Conflicts and requested the Board's ratification of that action.

Dr. Silber moved to amend item (d) above by deleting the word "/or " so that items (d) and (e) would read:

"(d) The exhaustion of all remedies at law including the instigation of litigation seeking declaratory relief from a court of competent jurisdiction; and

"(e) The filing of appropriate legislative amendments to the State Conflict-of-Interest Law."

Dr. Silber's motion to amend was seconded and approved by the Board and on the motion of Dr. Daube the Board ratified the Executive Committee's action as so amended.

B. Federal Grant Committee

The Chairman reported that the Executive Committee reviewed progress on Senator Kennedy's proposed "Star Schools" Legislation and the fact that the bill focuses more specifically than originally expected on providing K-12 math, science and language instruction, and on serving the needs of of schools eligible for Title 1 support. (Not less than 50% of the funds are presumably to be used for facilities, equipment, etc. aimed at serving Title I schools district student population.)

Dr. Knapp noted that if "Star Schools" is enacted in essentially its present form, MCET will have to apply to the US Secretary of Education for funding and compete with other applicants, many of whom have operating systems. Moreover, applicants in state/regions where overall educational (Kindergarten through post-secondary) policy is centrally controlled, where there are few higher education institutions, and where there is less local school autonomy may have an initial logistical advantage in pulling together an application reflecting a high degree of coordination.

Therefore, Dr. Knapp appointed a Federal Grant Committee whose role will include:

- Providing advice on application development and assistance to the Corporation in securing the support and cooperation of a wide range of institutions;

- Serving as application readers/advisors; and

- Ensuring coordination of federal application, accounting and other requirements with those of the state (Ch.560, Legislature and Governor, DCPO, etc.).

Chairman Knapp appointed Education Commissioner Harold Raynolds as Chairman of the Federal Grant Committee and the following persons as Committee members:

Sec. Joseph Alviani	Atty. Helen Donohue
Dr. David Knapp	Dr. Franklyn Jenifer
Dr. Lincoln Lynch	Dr. Kenneth Ryder
Dr. John Silber	Atty. Richard Snyder

C. Renewal of the Executive Director's Contract

Noting that the Executive Director's three year contract expires at the end of October 1987, and anticipating that the Board will be very busy with activities relating to its federal funding effort at that time, Chairman Knapp reported that the Executive Committee took up the matter of the renewal of Mr. Borten's contract.

The Board ratified the Executive Committee's vote:

In accordance with section 3 of Chapter 560 of the Acts of 1982 to authorize the Chairman to execute on behalf of the Massachusetts Corporation for Educational Telecommunications an employment contract reappointing Richard A. Borten as Executive Director for a period of three years effective November 1, 1987 to October 31, 1990 at his present salary subject to such adjustments to annual salary and including such other forms of compensation as may be authorized by the Board.

D. Resignations of Board Treasurer Charles Smith and Secretary James Samels.

Chairman Knapp announced that he has been advised of Charles Smith's resignation from the position of Corporation Treasurer and of Attorney James E. Samels' resignation from the position of Corporation Secretary.

The Board voted its deep gratitude for the service Messrs. Samels and Smith have provided to the Corporation.

The Chairman stated that in light of these resignations, he had asked Richard Snyder, as Chairman of the Nominating Committee to propose replacements for Messrs. Smith and Samels:

5. Report of the Nominating Committee

Mr. Snyder reported that the Nominating Committee proposed that Dr. Allen Koenig be designated as Secretary of the Corporation. The Board unanimously voted that Dr. Koenig be so designated.

Mr. Snyder stated that the Committee is currently seeking an appropriate replacement to Treasurer Charles Smith and asked that Mr. Smith continue to serve as Treasurer until the next Board meeting, at which time a replacement will be proposed.

Nominating Committee Chairman Snyder noted that the Board lacked the quorum needed to ratify a change in the By-Laws increasing the size of the Executive Committee from five to six members.

On the motion of Dr. Daube, the board unanimously approved the following resolution:

MOVED: To ratify and approve the vote taken at the March 16, 1987 meeting of the Board of Directors that Article V, Section 1 of the bylaws be amended by deleting the word "three (3)" before "Directors" and inserting "four (4)" so that the first sentence of that section reads "The Chairman, Vice Chairman and four (4) Directors elected by the Board of Directors at the annual meeting of the Board shall constitute the Executive Committee of the Board."

6. Report of the Executive Director

A. Mr. Borten reported that he recently met with US Deputy Secretary of Education Peter Greer who had asked to be briefed on the Star Schools legislation and MCET's proposed network. Greer expressed strong interest in the bill and general support for its goals.

B. Personnel/Salary Evaluation by Olney Associates

Mr. Borten noted that given the unique nature of MCET's work and many of its positions, he has asked the firm of Olney Associates, Inc. of Boston to prepare a Position Evaluation Study and Salary Administration Plan. This work will cost not more than $3,450 and will include:

1. An evaluation of staff position and salary structure which takes into consideration local, regional and national market salary data;

2. Management recommendations; and

3. Development of a salary administration plan.

Olney Associate's clients for such work includes Bowdoin College, Mass. Housing Finance Agency, Arthur D. Little, UMass Medical Center, the NE Journal of Medicine, and the Boston Economic Development and Industrial Corporation.

C. Action on Resolutions Pertaining to Consultant & Vendor Contracts for FY 88:

Mr. Borten requested the Board's approval for executing certain consultant and vendor contracts for the 1988 Fiscal Year.

The Executive Director reported that MCET has recently received two offers for the provision of Directors' and Officers' Liability Insurance, the more attractive of which is from International Insurance Company and provides coverage in the amount of $2.5 million for each director and in the aggregate with retentions of $1,000 per person, $5,000 for all parties and $5,000 for the Corporation. Such coverage is offered for an annual premium of $10,958.

On the motion of Dr. Koenig the Board unanimously approved the following resolution:

MOVED: In accordance with section 4(j) of chapter 560 of the Acts of 1982 to authorize the Executive Director to enter into a contract on behalf of the Massachusetts Corporation for Educational Telecommunications for professional liability insurance with International Insurance Company for a period of twelve months for a premium cost not to exceed $11,000 and made subject to the availability of funding.

[As requested by several Board members, a sample copy of the International policy is attached.]

On the motion of Dr. Ryder the Board unanimously approved the following resolution:

MOVED: In accordance with section 3 and 4 of Chapter 560 of the Acts of 1982 to authorize the Executive Director to execute on behalf of the Massachusetts Corporation for Educational Telecommunications consultant contract with Peat, Marwick, Main & Company for the provision of accounting services during the period July 1, 1987 through June 30, 1988 provided, however, that such contract shall be made subject to the availability of funding and in an amount not to exceed $14,900.

On the motion of Dr. Lynch the Board approved the following resolution with Atty. Snyder abstaining:

MOVED: In accordance with section 3 and 4 of Chapter 560 of the Acts of 1982 to authorize the Executive Director to execute on behalf of the Massachusetts Corporation for Educational Telecommunications consultant contract (s) for the provision of general legal services to the Corporation during the period July 1, 1987 through June 30, 1988 provided, however, tht such contract shall be made subject to the availability of funding and in an amount not to exceed $20,000.

[Vice Chairman Snyder stated that his law firm has not and will not seek to represent MCET. It was noted that funds for the retention of Attorney Kiley as Special Conflicts Counsel shall not be drawn from this fund.]

On the motion of Dr. Lynch the Board approved the following resolution:

MOVED: In accordance with section 3 and 4 of Chapter 560 of the Acts of 1982 to authorize the Executive Director to execute on behalf of the Massachusetts Corporation for Educational Telecommunications a consultant contract with Economics and Technology, Incorporated for the provision of consulting services relating to telecommunications economics, tariffs and financial planning during the period July 1, 1987 through June 30, 1988 provided, however, that such contract shall be made subject to the availability of funding and in an amount not to exceed $25,000.

On the motion of Dr. Lynch the Board approved the following resolution with Dr. Koenig abstaining:

MOVED: In accordance with section 3 and 4 of Chapter 560 of the Acts of 1982 to authorize the Executive Director to execute on behalf of the Massachusetts Corporation for Educational Telecommunications a consultant contract with John Atkinson for the provision of services relating to the development of network user education programs and video production planning during the period July 1, 1987 through June 30, 1988 provided, however, that such contract shall be made subject to the availability of funding and in an amount not to exceed $20,000.

On the motion of Dr. Lynch the Board unanimously approved the following resolution:

MOVED: In accordance with sections 3 and 4 of Chapter 560 of the Acts of 1982 to authorize the Executive Director to execute on behalf of the Massachusetts Corporation for Educational Telecommunications a consultant contract with Heron, Burchette, Ruckert & Rothwell for the provision of technical services regarding the regulation of telecommunications during the period July 1, 1987 through June 30, 1988 provided, however, that such contract shall be made subject to the availability of funding and in an amount not to exceed $15,000. [It was noted that this firm is admitted to practice law before the Federal Communications Commission.]

On the motion of Dr. Lynch the Board unanimously approved the following resolution:

MOVED: In accordance with sections 3 and 4 of Chapter 560 of the Acts of 1982 to authorize the Executive Director to execute on behalf of the Massachusetts Corporation for Educational Telecommunications a consultant contract with the CNS Corporation for the provision of professional engineering and system design services during the period July 1, 1987 through June 30, 1988 provided, however, that such contract shall be made subject to the availability of funding and in an amount not to exceed $50,000 plus reasonable and documented expenses.

D. Pilot Project/Technical Assistance Program Project

Mr. Borten noted that last year the Board authorized the expenditure of $174,000 for the planning and implementation of pilot projects through a Technical Assistance Program. The goals of this activity were to:

-- Determine the market for the use of telecommunications for the delivery of educational services;

-- Develop comprehensive information with regard to the cost of delivering such services;

-- Determine the extent to which existing capacities can serve the state and region's educational telecommunications needs;

-- Provide a wide range of institutions with initial experience in the use of educational telecommunications; and

-- Develop staff experience.

Calling the Board's attention to an extensive written report on the program, the Executive Director described the pilot project/TAP program as the most fruitful investment MCET has made to date. It has enabled MCET to carry out 14 transmission events and support a computer network for science teachers for 1 year. The program provided a vehicle for MCET to involve 23 institutions in serving as transmission receive sites, and four as origination sites.

The program put MCET in a direct working relationship with more than 40 Massachusetts institutions, and enabled MCET to develop a very strong working relationship with 14 cable companies and the New England Cable Television Association.

Mr. Borten requested the Board's authorization to expend $150,000 in fiscal year 1987 for the continuation of the Pilot Project/TAP Program.

Dr. Jenifer expressed concern that potential Conflicts-of-Interest be avoided in implementing pilot projects and the Technical Assistance Program.

On the motion of Dr. Daube the Board unanimously approved the following resolution:

MOVED: In accordance with sections 3 and 4 of Chapter 560 of the Acts of 1982 to authorize the Executive Director on behalf of the Massachusetts Corporation for Educational Telecommunications to implement a pilot project and technical assistance program to demonstration the potential uses and costs associated with educational telecommunications services provided, however, that expenses incurred for the period July 1, 1987 to June 30, 1988 shall be subject to the availability of funding and shall not exceed $150,000.

7. Meeting with Members of the Legislature's Joint Committee on Education

The following members of the Legislature's Joint Committee on Education met with the Board for the final half of the meeting: Rep. Nicholas Paleologos, Chairman; Rep. Mark Roosevelt; and Rep. Stanley Rosenberg. Janet Daisley of Senator Kraus' staff also attended the meeting.

After Dr. Knapp presented an overview of MCET's activities and goals, Chairman Paleologos and colleagues asked about meeting the network's operational and programming costs. Mr. Borten stated that it is anticipated that the receivers of video-courses and other services would pay for such transmissions, but that some state subsidy may be necessary. He noted, too, that schools may need state assistance in paying for internal wiring and equipment needed to enable their full participation in the network.

Chairman Paleologos urged that MCET keep the Legislature informed of its plans and progress, and suggested that teachers and school principals be involved in network planning.

The meeting was adjourned at 12:00 noon.

The next meeting of the MCET Board of Directors will be on Monday, September 21, 1987.

APPENDIX 8

KPMG Peat Marwick

Certified Public Accountants

MASSACHUSETTS CORPORATION FOR EDUCATIONAL TELECOMMUNICATIONS

Financial Statements
With Accompanying Information

June 30, 1987 and 1986

(With Accountants Report Thereon)

KPMG Peat Marwick

Certified Public Accountants

Peat Marwick Main & Co.
One Boston Place
Boston, MA 02108

Telephone 617 723 7700
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The Board of Directors
Massachusetts Corporation for
Educational Telecommunications:

We have examined the balance sheets of Massachusetts Corporation for Educational Telecommunications as of June 30, 1987 and 1986, and the related statements of support, revenue and expenses and changes in fund balance, and changes in financial position for the years then ended. Our examinations were made in accordance with generally accepted auditing standards and, accordingly, included such tests of the accounting records and such other auditing procedures as we considered necessary in the circumstances.

In our opinion, such financial statements present fairly the financial position of Massachusetts Corporation for Educational Telecommunications at June 30, 1987 and 1986, and the results of its operations and the changes in its financial position for the years then ended, in conformity with generally accepted accounting principles applied on a consistent basis.

Peat Marwick Main & Co.

July 23, 1987

MASSACHUSETTS CORPORATION FOR EDUCATIONAL TELECOMMUNICATIONS

Balance Sheet

June 30, 1987 and 1986

	1987	1986
Assets		
Current assets:		
Cash and cash equivalents	$ 592,749	247,477
Accounts receivable	19,005	-
Interest receivable	2,927	1,169
Prepaid expense	21,431	2,964
Total current assets	636,112	251,610
Equipment	36,591	21,979
Less accumulated depreciation	10,538	4,678
	26,053	17,301
	662,165	268,911
Liabilities and Fund Balance		
Current liabilities:		
Accounts payable	18,172	16,657
Accrued expenses	30,435	23,488
Estimated payroll taxes payable	1,006	52,280
Deferred restricted support	20,358	10,683
Total current liabilities	69,971	103,108
Fund balance	592,194	165,803
	$ 662,165	268,911

See accompanying notes to financial statements.

MASSACHUSETTS CORPORATION FOR EDUCATIONAL TELECOMMUNICATIONS

Statements of Support, Revenue and Expenses
and Changes in Fund Balance

Years ended June 30, 1987 and 1986

	1987			1986		
	Unrestricted Funds	Donor Restricted Funds	Total	Unrestricted Funds	Donor Restricted Funds	Total
Support and revenue:						
Grant revenue	$ 707,500	491,949	1,199,449	377,000	407,180	784,180
Interest income	37,199	-	37,199	25,506	-	25,506
Consulting fees	10,500	-	10,500	13,564	-	13,564
Program income	24,027	-	24,027	136	-	136
Total support and revenue	779,226	491,949	1,271,175	416,206	407,180	823,386
Expenses:						
General and administrative costs	352,835	-	352,835	365,233	-	365,233
Operating costs	-	491,949	491,949	-	407,180	407,180
	352,835	491,949	844,784	365,233	407,180	772,413
Excess of revenue over expenses	426,391	-0-	426,391	50,973	-0-	50,973
Fund balance, beginning of year	165,803		165,803	114,830		114,830
Fund balance, end of year	$ 592,194		592,194	165,803		165,803

See accompanying notes to financial statements.

MASSACHUSETTS CORPORATION FOR EDUCATIONAL TELECOMMUNICATIONS

Statements of Changes in Financial Position

Years ended June 30, 1987 and 1986

	1987	1986
Resources provided from:		
Excess of revenue over expenses	$ 426,391	50,973
Add charge not affecting resources:		
Depreciation	5,860	3,075
Total resources provided from operations	432,251	54,048
Increase in accounts payable	1,515	11,595
Increase (decrease) in accrued expenses	6,947	(9,997)
Increase (decrease) in estimated payroll taxes payable	(51,274)	22,502
Increase in deferred restricted support	9,675	10,683
Total resources provided	399,114	88,831
Resources used:		
Increase (decrease) in accounts receivable	19,005	(6,565)
Increase in interest receivable	1,758	135
Increase (decrease) in prepaid expenses	18,467	(1,793)
Acquisition of equipment	14,612	13,194
Total resources used	53,842	4,971
Increase in cash and cash equivalents	$ 345,272	83,860
Cash and cash equivalents, beginning of year	$ 247,477	163,617
Cash and cash equivalents, end of year	592,749	247,477
Increase in cash and cash equivalents	$ 345,272	83,860

See accompanying notes to financial statements.

MASSACHUSETTS CORPORATION FOR EDUCATIONAL TELECOMMUNICATIONS

Notes to Financial Statements

June 30, 1987 and 1986

(1) Organization

Massachusetts Corporation for Educational Telecommunications (MCET), a quasi-public corporation, was created by the state legislature in December 1982 under Chapter 560 of the Acts of 1982. MCET's purpose is to develop a statewide telecommunications network to meet the telecommunications needs of various public and private organizations within the Commonwealth of Massachusetts. MCET is supported by a grant from the Commonwealth of Massachusetts and contributions, grants, gifts and bequests from the private sector. Although MCET is placed within the University of Massachusetts, it is not subject to the control of the University or any other state agency within the Commonwealth. MCET is governed by an independent board of directors; twelve members are appointed by the Governor of the Commonwealth and six members are designated by the Massachusetts legislature.

(2) Summary of Significant Accounting Policies

Fund Accounting

To ensure adherence to limitations and restrictions placed on available resources, the accounts are to be maintained in accordance with the principles of fund accounting. Those funds restricted as to purpose and use are accounted for separately from funds available for general corporate use. Donor restricted funds represent funds restricted by the donor for particular development purposes and are deemed to be earned and reported as support when MCET has incurred expenditures in compliance with the specific restrictions. Such amounts received but not yet earned are reported as restricted deferred support. Unrestricted funds represent the portion of expendable funds that are available for all MCET expenses.

Equipment

Equipment is stated at cost, or in instances of donation, at fair market value. Depreciation is recorded using the straight-line method over the estimated useful life of the assets.

Income Taxes

MCET is exempt from Federal and state income taxes under IRC Section 115(1) as an instrumentality of the Commonwealth.

Donated Services

During part of 1987 and 1986, MCET received donated office space and support services from the Commonwealth of Massachusetts. Donated services are recorded on the financial accounts when a fair value for such services can be ascertained and when the services donated replace services which would otherwise be provided by employees. No income or expense was recorded in the accompanying financial statements as the value of such services could not be readily ascertained.

(Continued)

MASSACHUSETTS CORPORATION FOR EDUCATIONAL TELECOMMUNICATIONS

Notes to Financial Statements

Revenue Recognition

Support and revenue in the form of grants and donations are recorded when use of the cash or other donated assets is available to MCET.

Estimated Payroll Taxes Payable

The Internal Revenue Code Section 3121(u) requires that all employees of public instrumentalities hired after March 31, 1986 be subject to the hospital insurance employment tax. The provision for estimated payroll taxes in the amount of $1,006 represents the estimated liability for both employer and employee contributions.

In 1987, MCET received the IRS ruling confirming its status as a public instrumentality of the Commonwealth. Public instrumentalities are exempt from FICA taxes. The 1986 provision for estimated payroll taxes in the amount of $52,280 that represented the estimated liability of FICA taxes was reversed during 1987.

(3) Simplified Employee Pension Plan

MCET has adopted a simplified employee pension plan whereby a contribution equal to 10% of an employee's eligible wages (as defined by the plan) is contributed to a retirement account in that employee's name on a quarterly basis. Pension expense for the year ended June 30, 1987 and 1986 was $21,896 and $19,113, respectively.

(4) Leases

MCET's future minimum rental commitments under operating lease agreements for offices and equipment as of June 30 are as follows:

1988	67,000
1989	67,000
1990	50,000
1991	1,500

(Continued)

MASSACHUSETTS CORPORATION FOR EDUCATIONAL TELECOMMUNICATIONS

Notes to Financial Statements

(5) Restricted Grants

In September 1985, MCET received a grant from a local university to provide $1,250,000 to engage the services of a consultant in an effort to secure Federal support for the development of the telecommunications network and supporting facilities essential to this development. Consulting expenses charged to the grant were $491,949 and $407,180 in 1987 and 1986, respectively. MCET's agreement with the University provides for monthly payments of $41,667 for 30 months or completion of the project whichever is sooner. At June 30, 1987 the remaining balance available under the grant was $333,333.

(6) Property and Equipment

Property and equipment consisted of the following:

	June 30, 1987	June 30, 1986	Estimated Useful Life
Furniture and fixtures	$ 7,837	1,040	5 years
Office equipment	20,742	14,330	5 years
Computer equipment	8,012	6,609	5 years
	$ 36,591	21,979	

(7) Deferred Restricted Grants

Changes in deferred restricted grants in the donor restricted fund at June 30, 1987 are presented below:

Balance, beginning of year	$ 10,683
Additions:	
Grants	500,000
Investment income	1,624
	501,624
Deductions:	
Funds expended during the year	491,949
Balance, end of year	$ 20,358

KPMG Peat Marwick

Certified Public Accountants

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ACCOUNTANTS' REPORT ON INFORMATION ACCOMPANYING THE BASIC FINANCIAL STATEMENTS

Our examinations of the basic financial statements presented in the preceding section of this report were made for the purpose of forming an opinion on such financial statements taken as a whole. The accompanying information is presented for purposes of additional analysis and is not a required part of the basic financial statements. Such information has been subjected to the auditing procedures applied in the examinations of the basic financial statements, and, in our opinion, is fairly stated in all material respects in relation to the basic financial statements taken as a whole.

Peat Marwick Main & Co.
Certified Public Accountants

Boston, Massachusetts
July 23, 1987

ACCOMPANYING INFORMATION

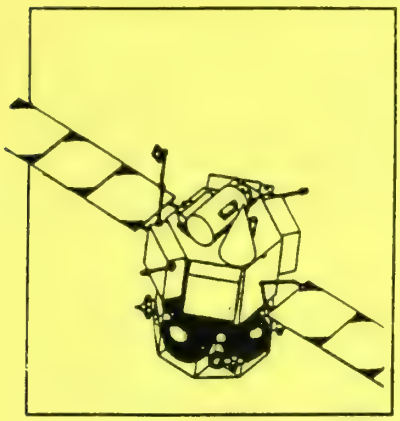
MASSACHUSETTS CORPORATION FOR EDUCATIONAL TELECOMMUNICATIONS

Statements of Expenses

Years ended June 30, 1987 and 1986

	1987	1986
General and administrative:		
Salaries and wages	$ 217,511	171,085
Payroll taxes	(51,274)	22,501
Pension	21,896	19,113
Professional fees	6,900	5,950
Equipment leasing	6,242	4,987
Travel and entertainment	7,412	4,968
Insurance - group	10,250	13,896
Insurance - other	4,720	4,435
Meetings	106	46
Telephone	8,211	5,312
Office supplies	3,700	3,010
Meetings and conferences	1,835	313
Repairs and maintenance	2,472	1,669
Printing and stationery	3,603	2,045
Insurance - life	1,613	1,288
Depreciation	5,860	3,075
Periodicals and books	1,373	1,476
Petty cash	232	309
Dues and subscriptions	703	633
Postage	2,185	519
Tuition reimbursement	1,920	1,260
Pilot programs	30,611	2,087
Miscellaneous	7,051	3,856
Telecommunication rentals	24,995	-
Consulting services	32,708	91,400
	352,835	365,233
Operating:		
MCET Development Trust Fund Consulting	$ 491,949	407,180

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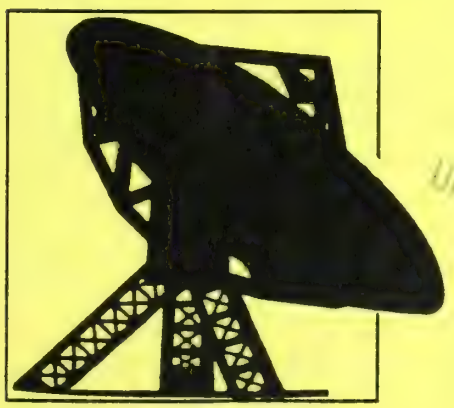


ANNUAL REPORT

For Fiscal Year 1988



Massachusetts Corporation for Educational Telecommunications (MCET)



GOVERNMENT DOCUMENTS COLLECTION
MAY 15 1989
University of Massachusetts
Depository Copy

Message from the Chairman

On behalf of the Board of Directors of the Massachusetts Corporation for Educational Telecommunications (MCET), I am pleased to submit the Corporation's Annual Report for Fiscal Year 1988.

As you will see in the pages that follow, FY88 was a dynamic year for MCET. Our highly successful Technical Assistance Program (TAP) helped more than 68 public and private institutions expand their education horizons by organizing 27 teleconferences serving more than 1300 individuals.

Perhaps more importantly, MCET organized an extensive planning effort aimed at developing a regional educational telecommunications network. We assessed state and regional telecommunications needs, we developed a technical plan for the network, and we identified 12 highly innovative education programs to be developed for the network.

At the conclusion of our planning effort, we submitted a $10 million proposal to the U.S. Department of Education for funding under the federal Star Schools program. Unfortunately, the Secretary of Education announced this week that the MCET will not receive a Star Schools grant.

While the Reagan Administration's decision not to fund our network is a setback, we plan to move forward toward development of a comprehensive, state-of-the-art telecommunications network. In Fiscal Year 1989 we will be aggressively pursuing a mix of federal, state, and corporate funding aimed at building such a network for the Commonwealth.

Our planning efforts demonstrated that the need for an effective educational telecommunications system in Massachusetts is fundamental to our educational and economic future. Our research revealed:

- Despite the presence of outstanding educational, scientific and other learning resources in Massachusetts, a great many of our schools have been forced to reduce the number of courses available in math, science and foreign languages – the very subjects most crucial to our economy.

- Many math, science and foreign language teachers are either inadequately prepared to teach these subjects or lack opportunities to upgrade their knowledge and develop new skills. Moreover, few graduates are entering the math, science and foreign language teaching fields.

- Other states throughout the region and the nation have begun to effectively use telecommunications to deal with these problems. At least 33 states have made substantial financial commitments to educational telecommunications. Massachusetts, which has perhaps the most to gain from such investment, continues to lag behind the rest of the nation.

Academic, industry and government leaders recognize the threats these educational problems pose to our state and to the entire nation. We must have a well-trained workforce . . . we cannot afford to tolerate deep disparities between "have" and "have not" schools . . . we can no longer justify our schools "doing without" important learning opportunities. We must and we can provide access to quality instruction for all our children.

The immense power of advanced telecommunications resides in its ability to overcome geographical barriers, to accelerate the diffusion of information and knowledge and, as a result, to begin to erase disparities of instructional quality through the effective sharing of educational resources. This is the goal to which MCET remains committed.

David C. Knapp, Chairman
(President, University of Massachusetts)
October 5, 1988

THE COMMONWEALTH OF MASSACHUSETTS

CORPORATION FOR EDUCATIONAL TELECOMMUNICATIONS

BOARD OF DIRECTORS

Dr. David C. Knapp, Chairman of the Board§*
President, University of Massachusetts

Joseph D. Alviani*§
Secretary of Economic Affairs
Commonwealth of Massachusetts

David M. Bartley
President
Holyoke Community College

Henry P. Becton, Jr. §
President
WGBH Educational Foundation

William M. Cantor
President
E. C. Hilliard Corporation

Helen A. Donohue, Esq. *
Attorney at Law

Eileen T. Farley
President
Bristol Community College

Dr. Franklyn G. Jenifer §
Chancellor
Board of Regents of Higher Education

Dr. Allen E. Koenig ²
President
Emerson College

Dr. Lincoln D. Lynch
Supt., Middleborough Public Schools
(Pres., New England Assoc. of School Supts.)

Dr. Vincent J. Mara
President
Fitchburg State College

Hon. Richard E. Neal
Mayor
City of Springfield

Harold Raynolds, Jr.§
Commissioner
Mass. Department of Education

Dr. Kenneth G. Ryder
President
Northeastern University

Dr. John R. Silber*
President
Boston University

Richard J. Snyder, Esq.* ¶
Managing Attorney, Goldstein & Manello
Chrmn, Brd of Trustees, Babson College

Hon. Paul A. Tamburello §
Justice
Massachusetts Superior Court

Charles C. Tretter, Esq.
General Counsel
New England Governors' Conference

———— *§* ————

Richard A. Borten
Executive Director

* *denotes Executive Committee Member*
§ *denotes Ex Officio Member*
¶ *denotes Vice Chairman of the Board*
² *denotes Secretary of the Corporation*

Table of Contents

Message from the Chairman i

Board of Directors iii

Table of Contents iv

ANNUAL REPORT 1

- Development of Regional Coalition 3
- Star Schools 4
- Technical Assistance Program 9
- Conferences 13
- Other Activities 14

APPENDICES 16

1. Star Schools Act - P.L. 100-297
2. Federal Register Notice - CDFA No. 84.203
3. Massachusetts Needs Assessment Survey Results
4. Supporting Institutions and Individuals
5. Abstract of MCET's Proposal - Northeast Star Schools Program
6. Senate Bill 201
7. Audit

Annual Report
Fiscal Year 1988

The Massachusetts Corporation for Educational Telecommunications (MCET) is an independent public corporation of the Commonwealth of Massachusetts established by Chapter 560 of the Acts of 1982. MCET's mission is to build and operate a statewide network to serve the educational and economic needs of a wide range of sectors — including schools, public and private higher education, health care and government.

In its initial years MCET built awareness of the importance of advanced telecommunications technologies on educational and economic development. During these years, MCET laid the groundwork for network development by assessing telecommunications needs in Massachusetts and examining the experiences of other states, many of which had already achieved substantial benefits from their commitments for funding of educational telecommunications.

FY88 was a watershed year for MCET. The Corporation applied extensive amounts of resources and energy to building the foundation for development of a telecommunications network for Massachusetts and New England. MCET's major accomplishments included the following:

- MCET initiated a close collaborative relationship among educational leaders from each of the seven Northeast states to work on cooperative telecommunications projects;

- MCET's work with congressional leaders resulted in the enactment and funding of the Star Schools Program Assistance Act. Star Schools provides the first federal support for technology in education since the beginning of the Reagan Administration;

- MCET developed a detailed programming and technical blueprint for a regional network that will form the cornerstone for future developments;

- MCET's Technical Assistance Program (TAP), after a highly successful initiation in FY87, expanded its role in assisting institutions to undertake the effective use of telecommunications technology for the delivery of educational services.

MCET came away from FY88 convinced that Massachusetts needs an educational telecommunications network; that there is an overwhelming demand for these services; and that such a network is a fundamental component of a healthy economic and educational environment.

Development of Regional Coalition

MCET initiated a collaborative relationship among educational leaders from each of the seven Northeast states aimed at the development of a regional telecommunications network and distance learning projects to improve primary and secondary instruction.

During Fiscal Year 1988 MCET worked with state educational leaders from the seven Northeast states in planning and implementing a major conference entitled *Distance Learning in the Northeast.* Held in Springfield on April 7-8, 1988, the conference brought together more than 400 educators and administrators from K-12 and higher education, who examined the issues of access to education via information technology.

During the spring, MCET formalized the collaborative relationship of Northeast educators in a *Regional Advisory Committee* (RAC) comprised of state education commissioners and chancellors of higher education from Connecticut, Maine, Massachusetts, New Hampshire, New York, Rhode Island and Vermont. The RAC was a guiding spirit in the development of MCET's Star Schools project. The relationships developed during these cooperative efforts will continue into future years.

MCET held four formal meetings with the RAC and numerous informal discussions with RAC members, to ensure that its Star Schools proposal responded to regional needs. MCET realized that many states throughout the region are strongly committed to the development of educational telecommunications. Both Maine and New York have invested substantial state funds in the construction of satellite transmitting and receiving facilities linking educational institutions in their states. Rhode Island has two statewide educational channels reaching all cable systems. Other states are well along in planning for telecommunications systems.

The RAC recognized that the various state networks have different strengths and weaknesses; participating states voiced an eagerness to share their educational programs with neighboring states in exchange for other resources they are lacking. The relationships developed during this process will be invaluable in the future — with or without Star Schools funding — and can enable institutions in Massachusetts to share resources with those in other states and work cooperatively toward common goals.

Star Schools

MCET's original network concept served as the model for the Star Schools Program Assistance Act, hailed by national education leaders as among the most important educational initiatives of the 1980s.

Congressional Action

As a result of discussions and hearings involving MCET, Senator Edward Kennedy introduced the "Star Schools Program Assistance Act" in the U.S. Senate during Fiscal Year 1987. The Star Schools Program provides grants for the development of model multi-state telecommunications networks to improve primary and secondary school instruction in three critical areas: mathematics, science and foreign languages.

Early in FY88, congressional conferees resolved differences between the versions of Star Schools passed by the Senate and House, and adopted most provisions of the stronger, Senate version. However, the conferees added a requirement that 25 percent of funds be dedicated for program development. The conference committee language was inserted into the Hawkins-Stafford Elementary and Secondary School Improvement Amendments, which received final passage from Congress and was signed by the President on April 28, 1988. [See **Appendix 1** for the final Star Schools Act, Public Law 100-297, 102 Stat. 320.]

On December 21, 1987, as part of the Permanent Continuing Appropriations Resolution, Congress appropriated $19,148,000 for Star Schools for the fiscal year ending September 30, 1988, with grants to be awarded by the Secretary of Education through a competitive grant process.

Department of Education Process

On April 5, 1988, the U.S. Department of Education published a notice in the Federal Register inviting applications for Star Schools Awards by June 15, 1988. [See **Appendix 2**, CDFA No. 84.203, 53 Fed. Reg. 11176.] The notice provided a description of what must be included in a Star Schools application and indicated that priority would be given to applications that provide significant new educational opportunities, particularly to traditionally underserved populations; secure the cooperation of a wide range of institutions in planning the network; offer substantial teaching capabilities, including the capability for upgrading teachers' skills; and serve a multi-state area.

region. MCET received 49 program applications, representing the best thinking of some of the most prestigious educational institutions in the country. From this pool, MCET and worked with the RAC to choose 12 first-year demonstration projects, which together would serve at least 246 public and private schools.

These projects are:

- **Science Lab** — The University of Lowell proposed to supplement classroom science programs with special two-way video lab presentations in Earth Science, Meteorology, Chemistry, Physics, and Biology.

- **New Directions in Elementary Science** — Boston's outstanding Museum of Science proposed the transmission of its highly respected teacher training program to schools throughout the region.

- **Foreign Language Institute** — The University of Massachusetts at Amherst proposed 10-week teacher training courses in German, French, Spanish, Latin, and Portuguese. In the second year, the project would expand to include student telecourses to bring international news, talk shows, and other programming — broadcast in foreign languages — into classrooms throughout the region.

- **Introduction to Japanese** — WGBH, Boston's renowned public television station, planned to offer a 15-week video course in Japanese language and culture for high school students.

- **Discrete Math** — Northeastern University would provide special instruction in discrete math to Boston area urban high school students. Special workshops for teachers also would be provided. Live instruction would be augmented by audiographics, computer simulations, and taped video segments.

- **The Big Ideas** — Boston University's series of live interactive presentations by master teachers would introduce major concepts in math and science to students in grades 6-8. Corresponding teacher training modules would have been offered as well.

- **Applied Biotechnology** — The New York State Department of Education planned to offer special courses to rural and urban students in agricultural science, with special emphasis on the application of advanced technologies in this important field.

- **High School Physics** — The University of Maine proposed to provide daily classroom/laboratory instruction in physics to students in isolated rural areas who would not otherwise have the opportunity to investigate science through the use of cutting-edge technology.

- **Russian Language** — A master Russian teacher would guide beginning students (grades 5-8) integrating Soviet television programs with live instruction from New York's Rensselaer, Columbia and Greene Counties.

- **Problem Solving in Mathematics and Science** — The University of Vermont proposed establishing an interactive video institute to provide teacher training

in math and science to elementary and secondary educators throughout Vermont and eventually the region.

- **Mathnet** — The New York Public Schools planned to offer telecourses focusing on critical thinking skills and targeted to urban students.

- **Urban Distance Learning Project** — The Hartford Public Schools proposed a series of curriculum enrichment and inservice programs in mathematics, science, and foreign languages for Chapter 1 students and their teachers in cities across the state.

The Technical Plan

MCET and its technical consultants analyzed and identified the most appropriate technical options for the telecommunications network, including a system using only satellite technology, a network using only microwave technology, several hybrid options, and various options using "compressed video." The goals of the network were to: draw on and bridge existing and emerging capabilities and facilities; provide a maximum number of institutions with the opportunity to deliver quality video programs; provide a maximum number of schools and other institutions with the opportunity to receive and interact with these programs; and provide the capability of two-way teleconferencing among selected sites. MCET also sought to minimize the need for site acquisition, extensive Federal Communications Commission licensing and costly space rental for the placement of communication equipment.

It was a fundamental goal of MCET to avoid the duplication of existing facilities and the need to construct or acquire new transmission capacity whenever possible. Therefore, the Corporation conducted extensive discussions with both commercial and non-profit operators of existing satellite uplink facilities and formed a Technical Regional Advisory Committee, comprised of representatives of institutions with facilities or capacities that might be integrated into its network. After much analysis and discussion, MCET arrived at a design making use of this existing capacity in a cost-effective system. The technical design includes the following capabilities:

- The ability to transmit programming from any of seven existing satellite uplinks in the region — made available at reduced or no cost — located at three locations in Boston, in Amherst, Massachusetts, in Albany and Utica, New York, and in Augusta, Maine;

- The ability for the maximum number of teaching sites to originate live, interactive programming, by connecting to these uplinks via owned and leased microwave facilities and cable television systems;

- The ability of schools throughout the region to receive satellite transmitted programming. MCET would place satellite receive equipment at cable systems, other existing local distribution networks, or directly at schools;

- The ability for all participating schools to enable students to see and interact with distance learning teachers through the use of Integrated Audio-Visual Classroom Systems;

- The ability to achieve dramatic economies in the cost of satellite transponder time through a bulk purchase arranged with MCET's collaborators from the other northeast states.

Working with its engineering consultants, MCET prepared a detailed draft Request for Proposals, which was included in the Northeast Star Schools Program application.

Support for the Network

More than 165 educational institutions, along with government, industry and health care leaders from throughout the Northeast, including 79 in Massachusetts, committed their support to the Corporation's Star Schools proposal. These endorsements further demonstrate the high level of interest in using telecommunications in education. [See **Appendix 4** for list of institutions submitting letters of support.]

On June 15, 1988, MCET submitted its comprehensive, three-volume Star Schools application to the U.S. Department of Education. The proposal sought $20 million in funding over two years for the Northeast Star Schools Program. To augment the $10 million first-year federal request, MCET secured commitments of $6,313,918 in matching contributions from the northeastern states, educational institutions, and private industry. The Corporation also secured an agreement from nationally renowned BBN Laboratories for design of a data network, and opened negotiations with NYNEX on in-kind contributions of telephone services.

The proposal included a detailed plan for the provision of technical assistance in use of distance learning to all participating schools, and provided a comprehensive plan for program evaluation and long-range planning. [See **Appendix 5**, Abstract of Proposal for the Northeast Star Schools Program.]

Technical Assistance Program

MCET's Technical Assistance Program introduced Massachusetts educators to the broad spectrum of distance learning technologies.

The Technical Assistance Program (TAP) was established in Fiscal Year 1987 to provide institutions with the opportunity to use distance learning, teleconferences and other forms of telecommunications to meet their educational objectives. The TAP has demonstrated the benefits that could accrue on a larger scale when institutions are connected to the telecommunications network MCET plans to build.

Since initiating this program the Corporation has provided services not otherwise available to Massachusetts institutions by demonstrating the multiple and exciting uses of telecommunications. Through interactive satellite teleconferencing, teachers have explored the range of new educational technologies available to them, health care professionals have kept in touch with the latest medical developments, and students have interacted with experts on the issue of water conservation. Through data networks, physics teachers and students have shared ideas and experiences. Through an audiographics hookup, students have taken an advanced mathematics course offered from a leading university. These projects have made a real difference in the lives of the participants, enabling them to gain new skills and learn critical information they would not otherwise have been able to obtain.

Background

The TAP was created to provide MCET with information about:

- The costs associated with the use of telecommunications for education;
- The market for educational telecommunications; and
- The limitations of existing telecommunications capacity in Massachusetts.

Since initiating this program, the Corporation has provided services not otherwise available to Massachusetts institutions. MCET:

- Assists institutions with little or no experience in video telecommunications in the planning and implementation of specific projects;
- Brokers existing telecommunications capacity, production facilities and remote site facilities;

- Trains on-camera and remote-site personnel;
- Evaluates distance learning projects to determine their effectiveness in comparison to on-site meetings or classes; and
- Subsidizes seventy-five percent of the transmission costs of projects.

In FY88, several institutions that had successfully implemented pilot projects through the Technical Assistance Program expressed an ongoing need for MCET's services to extend these projects. In response, the Corporation continued to provide technical assistance and to broker transmission services for these institutions, but eliminated the subsidization of transmission costs.

FY88 TAP Projects

MCET's Technical Assistance Program implemented 27 separate teleconferences, serving over 1300 individuals and 68 institutions. One project alone resulted in 101 hours of programming over cable television systems. The Corporation renewed its services for two highly successful FY87 TAP projects:

- **HealthNET**, a continuing education series of live interactive video conferences for health professionals, reached over twelve locations in Boston, Worcester, Springfield, Lawrence, Lowell, Fall River, Peabody, Provincetown and Nantucket. HealthNET is produced by the Area Health Education Center at Boston University Medical Center with funding from Smith, Kline and French Laboratories. The producers intend to continue this popular program in FY89, expanding it to the entire New England region.
- **Physics Forum**, a computer network for physics teachers, links more than 300 science teachers across the Commonwealth, enabling them to compare notes, improve curriculum and collaborate on projects. The Forum is operated by the University of Massachusetts at Amherst's Department of Physics and Astronomy in cooperation with the Pioneer Valley's Five College Consortium and MASSCUE (Massachusetts Computer Using Educators).

In Fiscal Year 1988 several exciting new demonstration projects, utilizing a variety of telecommunications technologies, were implemented:

- **The Housing Network**, sponsored by the Massachusetts Association for Mental Health, the Massachusetts Housing Partnership and the New England Mental Health Commissioners Association, brought together over 150 mental health providers and housing experts to discuss the problem of housing for the mentally disabled. This two-hour teleconference featured presentations by Amy S. Anthony, Secretary of Communities and Development and a number of mental health and housing experts. Participants at five remote sites throughout New England could ask questions of the panel through an audio hookup.

- **Technology in the Massachusetts Classroom**, a teleconference among the innovative educators who received grants under the Department of Education's Chapter 188 program, demonstrated the effective uses of technology in the classroom. The teleconference was cosponsored by MCET and the French River Education Center, with funding from the Massachusetts Department of Education's Bureau of Educational Technologies.

- **Introduction to the Calculus A**, developed by Harvard mathematics professor Dr. Daniel Goroff, used computers, electronic tablets and audioconferencing to provide interactive instruction to students at six sites across Massachusetts. The project was implemented by the Cambridge Teleteaching Group through Harvard Extension School, with funding from the Annenberg/CPB Project.

- **Telecourse Forum: The Annenberg/CPB Collection** brought together higher education faculty and administrators from across the state to explore via telecommunications the opportunities for enhancing education through distance learning and the application of the Annenberg/CPB Collection of video telecourses. The forum was sponsored by MCET and the Annenberg/CPB Project, in cooperation with the PBS Adult Learning Service.

- **University Television Services** brought together the University of Massachusetts at Boston and Boston University to provide over 100 hours of educational and public affairs programming to cable television subscribers in Boston and Brookline. The series was made possible with the cooperation of the Boston Educational Consortium for Communications Technologies, Boston Community Access and Programming Foundation and Brookline Community Cable.

- **Fresh Water: How Abundant Is It?** demonstrated methods of water conservation and discussed the role of the Massachusetts Water Resources Authority in providing water for the greater Boston area. Students from nine schools in the greater Boston area participated in the one-way video, two-way audio conference, sponsored by the Norwood public schools.

- **The Politics of Deafness in the Four Corners of the Globe**, a nationally broadcast teleconference, was shown on cable television's Learning Channel. The teleconference brought together an international panel of deaf professionals and education experts with deaf people across the nation to discuss issues of empowerment for deaf people in all cultures. Deaf and hearing viewers from around the country were able to call in via voice and TTY. The Deaf Media Collaborative and Somerville Community Access Television sponsored the event, with funding provided by AT&T; The Learning Channel; Conus Communications; WCVB-TV; Massachusetts Commission for the Deaf and Hard of Hearing; Holiday Inn of Somerville; Multi-Link, Inc.; Northeastern University; Telecommunications, Inc.; Boston Deaf Club; and H_2O Systems of Cape Coral, Florida.

An independent analysis of the TAP, the Corporation's ongoing needs assessments, and the response to its conferences reveal an increasing demand for distance learning in Massachusetts. MCET observed a number of important factors affecting the use of telecommunications for educational and economic development, including the following:

- The costs associated with the use of existing capacity are high and often prohibitive for many institutions interested in initiating distance learning projects.
- While MCET continues to have extremely positive relationships with providers of telecommunications capacity, the availability of that capacity is decreasing sharply.

These factors add urgency to efforts to develop telecommunications capacity that is *dedicated* to educational use, *accessible* to institutions throughout the state, and *affordable* to educational institutions.

Conferences

MCET responded to the need of the Commonwealth's institutions for more information about telecommunications by sponsoring three major conferences during FY88.

September Symposium

In September 1987, MCET sponsored the *MCETelecommunication September Symposium* as part of its Technical Assistance Program. The symposium focused on educational technologies, concepts, and applications for administrators, educators, and trainers in higher education, schools, health care, government and business. This day-long event, providing actual demonstrations of innovative projects, was attended by approximately 90 representatives of Massachusetts institutions.

SETNET

MCET had a key role in the planning of *SETNET'87*, an October 1987 conference that brought together over 230 representatives of the Commonwealth's public schools, colleges and universities, state agencies and businesses. Participants discussed the current use of telecommunications systems in the state, learned about telecommunications activities in other states and exchanged information about telecommunications needs.

Distance Learning in the Northeast

In April 1988 MCET co-sponsored *Distance Learning in the Northeast: Access and Equity in the Information Age*, a two day conference attended by approximately 400 educators from New England and New York. The focus was distance learning technologies, policies, resources and projects. The largest conference of this kind ever to be held in the Northeast, the event included 32 concurrent workshops, an exhibit area and the Resource Room where participants could gain hands-on access to examples of computer-based and live video-based distance learning resources.

Other Activities

Senator Kennedy Two-Way Videoconference

Using two-way interactive video technology Senator Edward Kennedy taught a class in American politics to high school students in Boston and Springfield. Students at Dorchester High School in Boston and Central High School in Springfield were able to see and hear one another in a unique demonstration of how modern telecommunications technology can be used to enhance the educational environment. Senator Kennedy has been a strong advocate of the use of telecommunications and technology in education in his role as Chairman of the U. S. Senate Committee on Labor and Education and his sponsorship of the Star Schools Program Assistance Act. The videocourse provided educators, students and the press with an opportunity to see the effectiveness of two-way communication in education.

MCET Presentations in FY88

During FY88, MCET staff members spoke at a number of conferences and workshops including:

New England Association of School Superintendents, Annual Convention, workshop presenter, Barnstable MA: September 14, 1987.

MCETelecommunications September Symposium, Keynote Address, Boston, MA: September 28, 1988.

Pittsfield Public Schools Telecommunications Task Force, presenter at meeting, Pittsfield, MA: September 30, 1987.

SETNET'87, Keynote Address, Boxborough, MA: October 6, 1987.

New England Board of Education, presenter at meeting, Durham, NH: October 16, 1987.

MASSCUE (Massachusetts Computer Using Educators) Fall Conference, workshop presenter, Foxborough, MA: October 24, 1987.

MAEM (Massachusetts Association for Educational Media) Annual Conference, workshop presenter, Chicopee, MA: November 2, 1987.

Empowerment Day, Massachusetts Department of Education, workshop presenter, West Boylston, MA: March 16, 1988.

APPLEFEST '88, moderator and presenter at conference workshop, Boston, MA: May 22, 1988.

Higher Education Computing Conference, workshop presenter, Fitchburg, MA: June 16, 1988.

Data Network Research

During FY88, MCET sought to identify and assess educational data networks in Massachusetts that might complement its video network. The Corporation surveyed the operators of national educational data networks, state-operated networks, as well as smaller bulletin board services operating on microcomputers. The findings indicated that there is a need for MCET to host a series meetings involving the Department of Education, the Board of Regents, the Board of Library Commissioners and other major educational data users to develop an integrated statewide plan.

Legislation

For the 1988 legislative session MCET refiled its bill to increase the membership of the Board of Directors from eighteen to nineteen through the addition of the commissioner of administration. This bill, S. 201, received a favorable report from the Committee on Education, and is currently awaiting action in the Senate. [**Appendix 6**, S. 201]

Ethics Provisions

MCET's mandate is to build and operate a telecommunications network benefiting a wide variety of institutions in the Commonwealth, some of whom are represented on MCET's Board of Directors. Sensitive to the need to avoid either actual or apparent conflict of interest, MCET's Committee on Conflicts worked closely with attorney Thomas R. Kiley on the formulation and adoption of a Code of Conduct for the Board of Directors and on the development and filing of legislation designed to protect the Board of Directors from undue exposure under the state Conflict of Interest Law, G.L.C. 268A. The Corporation and Mr. Kiley also worked closely with the state Ethics Commission, Common Cause and legislative leaders on the development of this legislation.

Board of Directors

In Fiscal Year 1988 President Eileen Farley of Bristol Community College was appointed to fill the vacancy on the MCET Board of Directors created by the resignation of President Jonathan Daube of Berkshire Community College.

Audit

The independent audit of MCET, performed by the management accounting firm of Peat Marwick Main is attached as **Appendix 7**.

APPENDIX 1

(2) by striking "1986," and inserting "1986 and"; and

Appropriation authorization.

(3) by adding at the end "There are authorized to be appropriated to carry out the provisions of this title $15,000,000 for fiscal year 1989 and such sums as may be necessary for each of the fiscal years 1990, 1991, 1992, and 1993.".

SEC. 2302. STAR SCHOOLS PROGRAM AUTHORIZED.

The Education for Economic Security Act is amended by adding at the end thereof the following new title:

Star Schools Program Assistance Act. Communications and telecommunications. 20 USC 4081 note.

"TITLE IX—STAR SCHOOLS PROGRAM

"SHORT TITLE

"SEC. 901. This title may be cited as the 'Star Schools Program Assistance Act'.

"STATEMENT OF PURPOSE

20 USC 4081.

"SEC. 902. It is the purpose of this title to encourage improved instruction in mathematics, science. and foreign languages as well as other subjects such as vocational education through a star schools program under which demonstration grants are made to eligible telecommunications partnerships to enable such eligible telecommunications partnerships to develop, construct, and acquire telecommunications audio and visual facilities and equipment, to develop and acquire instructional programming, and obtain technical assistance for the use of such facilities and instructional programming.

"PROGRAM AUTHORIZED

Grants. 20 USC 4082.

"SEC. 903. (a) GENERAL AUTHORITY.—The Secretary is authorized, in accordance with the provisions of this title, to make grants to eligible telecommunications partnerships for the Federal share of the cost of the development, construction, and acquisition of telecommunications facilities and equipment, of the development and acquisition of instructional programming, and of technical assistance.

"(b) AUTHORIZATION OF APPROPRIATIONS.—(1) There is authorized to be appropriated $100,000,000 for the period beginning October 1, 1987, and ending September 30, 1992.

"(2) No appropriation in excess of $20,000,000 may be made in fiscal year 1988, and no appropriation in excess of $60,000,000 may be made in any of the fiscal years 1989 through 1992 pursuant to paragraph (1) of this subsection.

"(3) Funds appropriated pursuant to this subsection shall remain available until expended.

"(c) LIMITATIONS.—(1)(A) A demonstration grant made to an eligible telecommunications partnership under this title may not exceed $10,000,000.

"(B) An eligible telecommunications partnership may receive a grant for a second year under this title, but in no event may such a partnership receive more than $20,000,000.

"(2) Not less than 25 percent of the funds available in any fiscal year under this Act shall be used for the cost of instructional programming.

"(3) Not less than 50 percent of the funds available in any fiscal year under this title shall be used for the cost of facilities, equipment, teacher training or retraining, technical assistance, or programming, for local educational agencies which are eligible to receive assistance under chapter 1 of title I of the Elementary and Secondary Education Act of 1965.

"(d) FEDERAL SHARE.—(1) The Federal share for any fiscal year shall be 75 percent.

"(2) The Secretary may reduce or waive the requirements of the non-Federal share required under paragraph (1) of this subsection upon a showing of financial hardship.

"ELIGIBLE TELECOMMUNICATIONS PARTNERSHIPS

20 USC 4083.

"SEC. 904. (a) GENERAL RULE.—In order to be eligible for demonstration grants under this title, an eligible telecommunications partnership shall consist of—

"(1) a public agency or corporation established for the purpose of developing and operating telecommunications networks to enhance educational opportunities provided by educational institutions, teacher training centers, and other entities, except that any such agency or corporation shall represent the interests of elementary and secondary schools which are eligible to participate in the program under chapter 1 of title I of the Elementary and Secondary Education Act of 1965; or

"(2) a partnership which includes three or more of the following, and at least one of which shall be an agency described in subparagraph (A) or (B), and which will provide a telecommunications network:

"(A) a local educational agency, which has a significant number of elementary and secondary schools which are eligible for assistance under chapter 1 of title I of the Elementary and Secondary Education Act of 1965 or elementary and secondary schools operated for Indian children by the Department of the Interior eligible under section 1005(d) of the Elementary and Secondary Education Act of 1965, Indians

"(B) a State educational agency, or a State higher education agency,

"(C) an institution of higher education,

"(D) a teacher training center which—

"(i) provides teacher preservice and inservice training, and

"(ii) receives Federal financial assistance or has been approved by a State agency, or

"(E)(i) a public agency with experience or expertise in the planning or operation of a telecommunications network,

"(ii) a private organization with such experience, or

"(iii) a public broadcasting entity with such experience.

"(b) SPECIAL RULE.—An eligible telecommunications partnership must be organized on a statewide or multistate basis.

"APPLICATIONS

20 USC 4084.

"SEC. 905. (a) APPLICATION REQUIRED.—Each eligible telecommunications partnership which desires to receive a demonstration grant under this title may submit an application to the Secretary, at such

time, in such manner, and containing or accompanied by such information as the Secretary may reasonably require.

"(b) CONTENTS OF APPLICATION.—Each such application shall—

"(1) describe the telecommunications facilities and equipment and technical assistance for which assistance is sought which may include—

"(A) the design, development, construction, and acquisition of State or multistate educational telecommunications networks and technology resource centers;

"(B) microwave, fiber optics, cable, and satellite transmission equipment;

"(C) reception facilities;

"(D) satellite time;

"(E) production facilities;

"(F) other telecommunications equipment capable of serving a wide geographic area;

"(G) the provision of training services to elementary and secondary school teachers (particularly teachers in schools receiving assistance under chapter 1 of title I of the Elementary and Secondary Education Act of 1965) in using the facilities and equipment for which assistance is sought; and

"(H) the development of educational programming for use on a telecommunications network;

"(2) describe, in the case of an application for assistance for instructional programming, the types of programming which will be developed to enhance instruction and training;

"(3) demonstrate that the eligible telecommunications partnership has engaged in sufficient survey and analysis of the area to be served to ensure that the services offered by the telecommunications partnership will increase the availability of courses of instruction in mathematics, science, and foreign languages, as well as the other subjects to be offered;

"(4) describe the teacher training policies to be implemented to ensure the effective use of the telecommunications facilities and equipment for which assistance is sought;

"(5) provide assurances that the financial interest of the United States in the telecommunications facilities and equipment will be protected for the useful life of such facilities and equipment;

"(6) provide assurances that a significant portion of the facilities, equipment, technical assistance, and programming for which assistance is sought will be made available to elementary and secondary schools of local educational agencies which have a high percentage of children counted for the purpose of chapter 1 of title I of the Elementary and Secondary Education Act of 1965;

Disadvantaged persons.

"(7) describe the manner in which traditionally underserved students will participate in the benefits of the telecommunications facilities, equipment, technical assistance, and programming assisted under this title;

"(8) provide assurances that the applicant will use the funds to supplement and not supplant funds otherwise available for the purpose of this title; and

"(9) provide such additional assurances as the Secretary may reasonably require.

"(c) APPROVAL OF APPLICATION; PRIORITY.—The Secretary shall, in approving applications under this title, give priority to applications which demonstrate that—

"(1) a concentration and quality of mathematics, science, and foreign language resources which, by their distribution through the eligible telecommunications partnership, will offer significant new educational opportunities to network participants, particularly to traditionally underserved populations and areas with scarce resources and limited access to courses in mathematics, science, and foreign languages; Disadvantaged persons.

"(2) the eligible telecommunications partnership has secured the direct cooperation and involvement of public and private educational institutions, State and local government, and industry in planning the network;

"(3) the eligible telecommunications partnership will serve the broadest range of institutions, including public and private elementary and secondary schools (particularly schools having significant numbers of children counted for the purpose of chapter 1 of title I of the Elementary and Secondary Education Act of 1965), programs providing instruction outside of the school setting, institutions of higher education, teacher training centers, research institutes, and private industry;

"(4) a significant number of educational institutions have agreed to participate or will participate in the use of the telecommunications system for which assistance is sought;

"(5) the eligible telecommunications partnership will have substantial academic and teaching capabilities including the capability of training, retraining, and inservice upgrading of teaching skills;

"(6) the eligible telecommunications partnership will serve a multistate area; and

"(7) the eligible telecommunications partnership will, in providing services with assistance sought under this Act, meet the needs of groups of individuals traditionally excluded from careers in mathematics and science because of discrimination, inaccessibility, or economically disadvantaged backgrounds.

"(d) GEOGRAPHIC DISTRIBUTION.—In approving applications under this title, the Secretary shall assure an equitable geographic distribution of grants. Grants.

"DISSEMINATION OF COURSES AND MATERIALS UNDER THE STAR SCHOOLS PROGRAM

"SEC. 906. (a) REPORT.—Each eligible telecommunications partnership awarded a grant under this title shall report to the Secretary a listing and description of available courses of instruction and materials to be offered by educational institutions and teacher training centers which will be transmitted over satellite, specifying the satellite on which such transmission will occur and the time of such transmission. 20 USC 4085

"(b) DISSEMINATION OF COURSES OF INSTRUCTION.—The Secretary shall compile and prepare for dissemination a listing and description of available courses of instruction and materials to be offered by educational institutions and teacher training centers equipped with satellite transmission capabilities, as reported to the Secretary under subsection (a) of this section.

"(c) DISSEMINATION TO STATE EDUCATIONAL AGENCIES.—The Secretary shall distribute the list required by subsection (b) of this section to all State educational agencies.

"DEFINITIONS

20 USC 4086.

"SEC. 907. As used in this title—

"(1) the term 'educational institution' means an institution of higher education, a local educational agency, and a State educational agency;

"(2) the term 'institution of higher education' has the same meaning given that term under section 1201(a) of the Higher Education Act of 1965;

"(3) the term 'local educational agency' has the same meaning given that term under section 1471(10) of the Elementary and Secondary Education Act of 1965;

"(4) the term 'instructional programming' means courses of instruction, and training courses, and materials for use in such instruction and training which have been prepared in audio and visual form on tape, disc, film, or live, and presented by means of telecommunications devices;

"(5) the term 'public broadcasting entity' has the same meaning given that term in section 397 of the Communications Act of 1934;

"(6) the term 'Secretary' means the Secretary of Education;

"(7) the term 'State educational agency' has the same meaning given that term under section 1471(16) of the Elementary and Secondary Education Act of 1965; and

"(8) the term 'State' means each of the several States, the District of Columbia, the Commonwealth of Puerto Rico, Guam, American Samoa, the Virgin Islands, the Trust Territory of the Pacific Islands, and the Commonwealth of the Northern Mariana Islands.".

SEC. 2303. REPEAL.

20 USC 3961-3973, 4001-4003, 4031, 4031 note, 4032-4037, 4051-4062.

Titles II, IV, VI, and VII of the Education for Economic Security Act are repealed.

PART D—VOCATIONAL EDUCATION

SEC. 2401. TECHNICAL AMENDMENT.

(a) USES OF FUNDS.—Section 201 of the Carl D. Perkins Vocational Education Act (20 U.S.C. 2331) is amended—

(1) in subsection (b)(4), by striking "or homemakers;" and inserting ", homemakers, or single pregnant women;"; and

(2) in subsection (f), by striking "and homemakers" each place it appears and inserting ", homemakers, and single pregnant women".

(b) DISTRIBUTION OF ASSISTANCE.—Section 202(a)(4) of the Carl D. Perkins Vocational Education Act (20 U.S.C. 2332(4)) is amended by striking "and homemakers;" and inserting ", homemakers, or single pregnant women;".

(c) CONFORMING AMENDMENT.—Section 202 of the Carl D. Perkins Vocational Education Act (20 U.S.C. 2332) is amended—

(1) by striking "(a)"; and

(2) by striking subsection (b).

SEC. 2402. THE NATIONAL CENTER FOR RESEARCH IN VOCATIONAL EDUCATION.

(a) IN GENERAL.—From funds appropriated for the fiscal year 1987 for section 404 of the Carl D. Perkins Vocational Education Act of 1984, the Secretary of Education shall provide financial assistance to a Center for Research in Vocational Education at The Ohio State University in the amount of $2,000,000 and the University of California at Berkeley in the amount of $2,000,000 to support ongoing activities, but not to support any new hiring after April 10, 1988, through December 31, 1988. Funds allocated to either institution shall be shared equitably according to the expenses of all subcontractors. The funds made available under this section shall not be affected by the outcome of the final decision on a grant award recipient for the National Center for Research in Vocational Education. Any funds received under this section shall be deducted from the total award made for a National Center for the 1988 grant award year.

(b) CONSTRUCTION.—Nothing in this section shall be construed to affect the decision with respect to the location of the National Center for Research in Vocational Education.

PART E—COMPREHENSIVE CHILD DEVELOPMENT PROGRAM

Comprehensive Child Development Centers Act of 1988.

SEC. 2501. SHORT TITLE.

42 USC 9801 note.

This part may be cited as the "Comprehensive Child Development Centers Act of 1988".

SEC. 2502. STATEMENT OF PURPOSE.

42 USC 9881 note.

It is the purpose of this part to provide financial assistance to projects, on a multiyear basis, that—

(1) are designed to encourage intensive, comprehensive, integrated, and continuous supportive services for infants and young children from low-income families;

(2) will enhance their physical, social, emotional, and intellectual development and provide support to their parents and other family members; and

(3) target services on infants and young children from families who have incomes below the poverty line and who, because of environmental, health, or other factors, need intensive and comprehensive supportive services to enhance their development.

SEC. 2503. PROGRAM AUTHORIZED.

Chapter 8 of subtitle A of title VI of the Omnibus Budget Reconciliation Act of 1981 (Public Law 97-35; 42 U.S.C. 9801 et seq.) is amended by adding at the end the following:

"Subchapter E—Comprehensive Child Development Program

Comprehensive Child Development Act Grants.

"SHORT TITLE

42 USC 9801 note.

"SEC. 670M. This subchapter may be cited as the "Comprehensive Child Development Act".

20 USC 4832 note.

SEC. 6215. REPORT ON PROJECTS DEVELOPED WITH ASSISTANCE FROM THE FUND FOR IMPROVEMENT AND REFORM OF SCHOOLS AND TEACHING.

(a) EXEMPLARY PROJECTS.—The Secretary shall take appropriate steps to ensure that information regarding exemplary projects that are developed with assistance furnished under part B of title III of this Act are made available to institutions of higher education and State and local educational agencies.

(b) REPORT.—The Secretary shall submit a final report to the appropriate committees of the Congress not later than June 1, 1990. The report shall describe the programs assisted by part B of title III of this Act, document the success of such programs in improving education, and make such recommendations as the Secretary deems appropriate.

(c) REPORT FOR CONTINUED FUNDING RULE.—As a condition to continue to receive funding after the first year of a multi-year project, the project administrator shall submit an annual report to describe the activities conducted during the preceding year and the progress that has been made toward reaching the goals described in its application, if applicable.

20 USC 642 note.

SEC. 6216. STUDY OF EFFECTIVENESS OF PUBLIC LAW 815.

(a) GENERAL AUTHORITY.—The Comptroller General shall conduct a thorough study of the need for financial assistance for school construction as authorized by the Act of September 23, 1950 (Public Law 815, 81st Congress). The Comptroller General shall prepare and submit a report on the study required by this section not later than 1 year after the date of enactment of this Act together with such recommendations, including recommendations for such legislation, as the Comptroller deems necessary.

Reports.

(b) CONTENTS OF STUDY.—In carrying out the study required by subsection (a) of this section, the Comptroller General shall examine a representative sample of federally impacted school districts of local educational agencies. The Comptroller General shall—

(1) identify the number of children affected in each such school district;

(2) determine the type of school facility needed for such school district; and

(3) determine the estimated cost involved for building or repairing the school facility in each such district.

(c) SPECIAL CONSIDERATION REQUIRED.—In conducting the study required by this section, the Comptroller General shall give special consideration to—

(1) the eligibility criteria used for determining which federally impacted school districts are entitled to Federal funds for school construction,

(2) the criteria used for setting the priorities for the approval of such applications, and

(3) the process for reevaluating the needs of previously approved applicants which are on the waiting list for funds covered under Public Law 815, Eighty-first Congress.

PART D—GENERAL PROVISIONS

SEC. 6301. DEFINITIONS.

20 USC 2701 note.

Except as otherwise provided, for the purpose of this Act the terms used in this Act have the meanings provided under section 1471 of chapter 1 of title I of the Elementary and Secondary Education Act of 1965.

SEC. 6302. BUDGET ACT PROVISION.

20 USC 2701 note.

Any new spending authority (within the meaning of section 401 of the Congressional Budget Act of 1974) which is provided under this Act shall be effective for any fiscal year only to the extent or in such amounts as are provided in appropriation Acts.

SEC. 6303. EFFECTIVE DATES.

20 USC 2701 note.

(a) GENERAL RULE.—Except as otherwise provided, this Act and the amendments made by this Act shall take effect July 1, 1988.

(b) SPECIAL RULES.—(1) Any provision of this Act or any amendment made by this Act which authorizes appropriations for fiscal year 1988 shall take effect on the date of the enactment of this Act.

(2) The provisions of section 2402, relating to the National Center for Vocational Research, shall take effect on April 10, 1988.

(3) The amendments made by section 3403 shall take effect for assessments made after September 30, 1989, with respect to State data.

Approved April 28, 1988.

LEGISLATIVE HISTORY—H.R. 5 (S. 373):

HOUSE REPORTS: No. 100-95 (Comm. on Education and Labor) and No. 100-567 (Comm. of Conference).

SENATE REPORTS: No. 100-222 accompanying S. 373 (Comm. on Labor and Human Resources).

CONGRESSIONAL RECORD:

Vol. 133 (1987): May 20, 21, considered and passed House.
Dec. 1, considered and passed Senate, amended, in lieu of S. 373

Vol. 134 (1988): Apr. 19, House rejected conference report; receded and concurred in Senate amendment with an amendment
Apr. 20, Senate concurred in House amendment

WEEKLY COMPILATION OF PRESIDENTIAL DOCUMENTS, Vol. 24 (1988):
Apr. 28, Presidential remarks.

○

APPENDIX 2

Federal Register

Tuesday
April 5, 1988

Part III

Department of Education

Applications for New Awards for Fiscal Year 1988 Under the Star Schools Program; Notice

DEPARTMENT OF EDUCATION

[CDFA NO: 84.203]

Notice Inviting Applications for New Awards for Fiscal Year 1988 Under the Star Schools Program

Purpose of Program: Provides demonstration grants to eligible telecommunications partnerships to develop, construct and acquire telecommunications audio and visual facilities and equipment, to develop and acquire instructional programming, and to obtain technical assistance for the use of such facilities and instructional programming, in order to encourage improved instruction in mathematics, science, and foreign languages as well as other subjects such as vocational education.

Deadline for Transmittal of Applications: June 15, 1988.

Available Funds: $19,148,000.

Estimated Range of Awards: Up to $10,000,000 per year.

Project Period: Awards will be made for a period of up to two years. Funding of projects after the first year will be contingent upon availability of funds from future Star Schools appropriations, and the other factors set forth in 34 CFR 75.253(a).

Budget Period: 12 months.

Important Notice to Applicants: This notice is a complete application package containing all the necessary information, application forms, and instructions needed to apply for a grant under this program. No other application package is necessary.

Authority and Description of the Program

The Star Schools Program for fiscal year 1988 is authorized under Pub. L. 100–202 (Permanent Continuing Appropriations for Fiscal Year 1988). Section 137(a) of Pub. L. 100–202 states that the Star Schools Program is to be carried out in accordance with the provisions of Title IX of the Education for Economic Security Act, relating to Star Schools, as contained in Section 6005, of S. 373, the Senate amendment to H.R. 5. (See Robert T. Stafford Elementary and Secondary Education Improvement Act, S. 373, 133 *Cong. Rec.* S17046–47, Dec. 2, 1987.)

Eligible Parties

Telecommunications partnerships must be organized on a statewide or multistate basis to be eligible. Two types of partnerships are eligible:

(a) A public agency or corporation established for the purpose of developing and operating telecommunications networks to enhance educational opportunities provided by educational institutions, teacher training centers, and other entities. Any such agency or corporation must represent the interests of elementary and secondary schools eligible to participate in Chapter 1 of the Act; or

(b) A partnership that will provide a telecommunications network that includes three or more of the following, at least one of which shall be an agency described in (1) or (2):

(1) A local educational agency that has a significant number of elementary and secondary schools that are eligible for assistance under Chapter 1 of the Act, or are operated by the Department of Interior for Indian children eligible under section 1005(d) of the Act;

(2) A State educational agency, or a State higher education agency;

(3) An institution of higher education;

(4) A teacher training center which provides preservice and inservice training and which receives Federal financial assistance or has been approved by a State agency;

(5) A public agency with experience or expertise in operating or planning a telecommunications network;

(6) A private organization with such experience;

(7) A public broadcasting entity with such experience.

Priorities

In accordance with 34 CFR 75.105(c)(2)(ii), the Secretary shall select an application that meets one or more of the following priorities over an application of comparable merit that meets fewer of the priorities or none of the priorities. Priority will be given to applications that demonstrate that:

(a) A concentration and quality of mathematics, science and foreign language resources will, by their distribution through the eligible telecommunications partnership, offer significant new educational opportunities to network participants, particularly to traditionally underserved populations and areas with scarce resources and limited access to courses in mathematics, science, and foreign languages.

(b) The eligible telecommunications partnership has secured the direct cooperation and involvement of public and private educational institutions, State and local government, and industry in planning the network.

(c) The eligible telecommunications network will serve the broadest range of institutions, including public and private elementary and secondary schools, particularly schools having significant numbers of children counted for the purpose of Chapter 1 of the Act, programs providing instruction outside of the school setting, institutions of higher education, teacher training centers, research institutes, and private industry.

(d) A significant number of educational institutions have agreed to participate or will participate in the use of the telecommunications system for which assistance is sought.

(f) The eligible telecommunications partnership will have substantial academic and teaching capabilities including the capability of training, retraining, and inservice upgrading of teaching skills.

(g) The eligible telecommunications partnership will serve a multistate area.

(h) The eligible telecommunications partnership will, in providing services with assistance sought under the Act, meet the needs of groups of individuals traditionally excluded from careers in mathematics and science because of discrimination, inaccessibility, or economically disadvantaged backgrounds.

Geographic Distribution

The Secretary shall assure an equitable geographic distribution of grants.

Matching Funds

The Federal share for any grant shall be 75 percent. Applicants must provide at least 25 percent matching on a cash or in-kind basis. Determinations as to which costs or contributions may be counted toward the matching requirement will be made in accordance with 34 CFR Part 74, Subpart G (Cost-Sharing or Matching). All resources must be used to supplement and not supplant resources otherwise available for purposes of the Act. The Secretary will consider requests to reduce or waive matching requirements upon a showing of financial hardship.

Budget Requirement

The Secretary is required by the Act to award not less than 25 percent of the funds appropriated for instructional programming, and not less than 50 percent for facilities, equipment, teacher training or retraining, technical assistance, or programming for local educational agencies which are eligible to receive assistance under Chapter 1 of the Act. Therefore each applicant is requested to provide a separate detailed budget for activities associated with each of these two areas. See Special Budget Requirement. (Appendix F)

Definitions

The following definitions apply to the terms used in this notice:

"Act" means the Robert T. Stafford Elementary and Secondary Education Improvement Act, as introduced in S. 373, the Senate Amendment to H.R. 5.

"Educational institution" means an institution of higher education, a local educational agency, or a State educational agency.

"Institutional" of higher education" has the same meaning given that term under section 1201(a) of the Higher Education Act of 1965, as amended.

"Instructional programming" means courses of instruction for students and training courses for teachers, and materials for use in such instruction and training which have been prepared in audio and visual form on tape, disc, film or live, and presented by means of telecommunications devices.

"Local educational agency" means a public board of education or other public authority legally constituted within a State for either administrative control or direction of, or to perform a service function for, public elementary or secondary schools in a city, county, township, school district, or other political subdivision of a State, or such combination of school districts or counties as are recognized in a State as an administrative agency for its public elementary or secondary schools. "Local educational agency" includes any other public institution or agency having administrative control and direction of a public elementary or secondary school.

"Public broadcasting entity" has the same meaning given that term in section 397 of the Communications Act of 1934.

"Secretary" means the Secretary of Education.

"State" means each of the several States, the District of Columbia, the Commonwealth of Puerto Rico, Guam, American Samoa, the Virgin Islands, the Trust Territory of the Pacific Islands, and the Commonwealth of the Northern Mariana Islands.

"State educational agency" means the officer or agency primarily responsible for the State supervision of public elementary and secondary schools.

Selection Criteria

(a)(1) The Secretary evaluates the applications for new grants under the Star Schools Program on the basis of the selection criteria in paragraph (b).

(2) The Secretary awards up to 100 points, including an additional 15 points distributed in accordance with 34 CFR 75.210(c).

(3) The maximum possible score for each criterion is indicated in parentheses after the heading of the criterion.

(b)(1) *Meeting the purpose of the authorizing statute.* (30 points) The Secretary reviews each application to determine how well the project will meet the purpose of the statute that authorizes the program, as stated in the "Purpose of Program" section of this notice, including consideration of—

(i) The objectives of the project; and

(ii) How the objectives of the project further the purposes of the authorizing statute.

(2) *Extent of need for the project.* (20 points) The Secretary reviews each application to determine the extent to which the project meets specific needs recognized in the statute that authorized the program, as stated in the "Purpose of Program" section of this notice, including consideration of—

(i) The needs addressed by the project;

(ii) How the applicant identified those needs;

(iii) How these needs will be met by the project; and

(iv) The Benefits to be gained by meeting those needs.

(3) *Plan of operation.* (20 points) The Secretary reviews each application to determine the quality of the plan of operation for the project, including—

(i) The quality of the design of the project;

(ii) The extent to which the plan of management is effective and ensures proper and efficient administration of the project;

(iii) How well the objectives of the project relate to the purpose of the program, as stated in the "Purpose of Program" section of this notice;

(iv) The quality of the applicant's plans to use its resources and personnel to achieve each objective; and

(v) How the applicant will assure that project participants who are otherwise eligible to participate are selected without regard to race, color, national origin, gender, age, or handicapping condition.

(4) *Quality of key personnel.* (10 points)

(i) The Secretary reviews each application to determine the quality of key personnel the applicant plans to use on the project, including—

(A) The qualifications of the project director (if one is to be used);

(B) The qualifications of each of the other key personnel to be used in the project;

(C) The time that each person referred to in paragraphs (b)(4)(i) (A) and (B) of this section will commit to the project; and

(D) How the applicant, as part of its nondiscriminatory employment practices, will ensure that its personnel are selected for employment without regard to race, color, national origin, gender, age, or handicapping condition.

(ii) To determine personnel qualifications under paragraphs (b)(4)(i) (A) and (B) of this section, the Secretary considers—

(A) Experience and training in fields related to the objectives of the project and

(B) Any other qualifications that pertain to the quality of the project.

(5) *Budget and cost-effectiveness.* (5 points) The Secretary reviews each application to determine the extent to which—

(i) The budget for the project is adequate to support the project; and

(ii) Costs are reasonable in relation to the objectives of the project.

(6) *Evaluation plan.* (5 points) The Secretary reviews each application to determine the quality of the evaluation plan for the project, including the extent to which the applicant's methods of evaluation—

(i) Are appropriate to the project;

(ii) To the extent possible, are objective and produce data that are quantifiable.

(Cross-reference: See 34 CFR 75.590 Evaluation by the Grantee.)

(7) *Adequacy of resources.* (10 points) The Secretary reviews each application to determine the adequacy of the resources that the applicant plans to devote to the project, including facilities, equipment and supplies.

Applicable Regulations

The Education Department General Administrative Regulations (EDGAR) in 34 CFR Part 74 (Administration of Grants), Part 75 (Direct Grant Programs), Part 77 (Definitions that Apply to Department Regulations), and Part 78 (Education Appeal Board).

Application Instructions and Forms

The application should be divided into three parts. The parts are as follows:

Part I: Federal Assistance Face Sheet. (Form SF–424 and instructions.)

Part II: Budget Information (form and instructions.)

Part III: Application narrative.

These forms and instructions are found in appendices to this notice. No grant may be awarded unless a completed application has been received (34 CFR 75.104).

Instructions for Transmittal of Applications

Applicants are advised to reproduce and complete the application forms in this notice. Applicants are required to submit an original and two copies of each application.

Application Delivered by Mail: An application sent by mail must be addressed to the U.S. Department of Education, Application Control Center (CFDA #84.203), 400 Maryland Avenue, SW., Washington DC 20202.

An applicant must show proof of mailing consisting of one of the following:

(1) A legibly dated U.S. Postal Service postmark.

(2) A legible mail receipt with the date of mailing stamped by the U.S. Postal Service.

(3) A dated shipping label, invoice or receipt from a commercial carrier.

(4) Any other proof of mailing acceptable to the Secretary of Education. If an application is sent through the U.S. Postal Service, the Secretary does not accept either of the following as proof of mailing: (1) A private meter postmark, or (2) a mail receipt that is not dated by the U.S. Postal Service.

An applicant should note that the U.S. Postal Service does not ordinarily provide a dated postmark. Before relying on this method, an applicant should check with its local post office.

An applicant is encouraged to use registered or at least first class mail. Each late applicant will be notified that its application will not be considered.

Application Delivered by Hand: An application that is hand-delivered must be taken to the U.S. Department of Education, Application Control Center, Room 3633, Regional Office Building #3, 7th & D Streets, SW., Washington DC.

The Application Control Center will accept hand-delivered applications between the hours of 8:00 a.m. and 4:30 p.m. (Washington DC time) daily, except Saturdays, Sundays and Federal holidays.

An application that is hand-delivered will not be accepted after 4:30 p.m. on the closing date.

Note.—The applicant *must* indicate on the envelope the CFDA number of the competition under which the application is being submitted. (The CFDA number for this competition is 84.203.)

Information Conference

An information conference for prospective applicants and interested parties will be held on Monday, April 18, 1988 in Room 326 of 555 New Jersey Avenue, NW., Washington, DC from 1:00 p.m. until 4:00 p.m. Prospective applicants who are unable to attend are invited to contact Gordon McAndrew (see address below) for a written summary of questions asked at the conference and the answers provided.

For Further Information Contact: Gordon McAndrew, U.S. Department of Education, Office of Educational Research and Improvement, 555 New Jersey Avenue, NW., Washington DC 20208; Phone: (202–357–6126).

Assessment of Educational Impact

The Secretary requests comments on whether the information collection requirements in this notice would require transmission of information that is being gathered by or is available from any other agency or authority of the United States.

Authority: Pub. L. 100–202, Section 137(a).

Dated: March 16, 1988.

Chester E. Finn, Jr.,

Assistant Secretary for Educational Research and Improvement.

FORM APPROVED
OMB No. 1850–0623
EXPIRATION DATE 3/19/91

Appendices—Instructions and Forms

Appendix A

Instructions for Part I Federal Assistance Face Sheet (SF 424)

This is a standard form used by applicants as a required face sheet for preapplications and applications submitted in accordance with OMB Circular A–102.

The applicant completes only items 1–23. Items 24–33 are completed by Federal agencies.

Where possible, information has been preprinted for your convenience. Items which are not applicable have been marked "N/A".

Below is a list of instructions to assist you in completing the applicable items in the form.

Item

2a. Applicant's control number, if desired.

2b. Date forms prepared (at applicant's option).

4a–h. Legal name of applicant, name of primary organizational unit which will undertake the assistance activity, complete address of applicant, and name and telephone number of the person who can provide further information about this request.

5. If the applicant's organization has been assigned an ED–CRS entity number consisting of the IRS employer identification number prefixed by "1" and suffixed by a two-digit number, enter the full entity number in block 5.

7. Provide the title and a summary description of the project.

8. "City" includes town, township or other municipality.

9. List only largest unit, or units affected, such as State, country or city.

12a. Amount requested or to be contributed during the first funding/budget period by the Federal government.

12f. Enter the same amount shown in 12a.

13. Self-explanatory.

14. Self-explanatory.

23. Name and title of authorized representatives of legal applicant and signature.

BILLING CODE 4000–01–M

Appendix B GENERAL INSTRUCTIONS FOR THE SF-424

This is a standard form used by applicants as a required facesheet for preapplications and applications submitted in accordance with OMB Circular A-102. It will be used by Federal agencies to obtain applicant certification that states which have established a review and comment procedure in response to Executive Order 12372 and have selected the program to be included in their process have been given an opportunity to review the applicant's submission.

APPLICANT PROCEDURES FOR SECTION I

Applicant will complete all items in Section I with the exception of Box 3, "State Application Identifier." If an item is not applicable, write "NA." If additional space is needed, insert an asterisk "*," and use Section IV. An explanation follows for each item:

Item

1. Mark appropriate box. Preapplication and application are described in OMB Circular A-102 and Federal agency program instructions. Use of this form as a Notice of Intent is at State option. Federal agencies do not require Notices of Intent.

2a. Applicant's own control number, if desired.

2b. Date Section I is prepared (at applicant's option).

3a. Number assigned by State.

3b. Date assigned by State.

4a–4h. Legal name of applicant, name of primary organizational unit which will undertake the assistance activity, complete address of applicant, and name and telephone number of the person who can provide further information about this request.

5. Employer Identification Number (EIN) of applicant as assigned by the Internal Revenue Service.

6a. Use Catalog of Federal Domestic Assistance (CFDA) number assigned to program under which assistance is requested. If more than one program (e.g., joint funding), check "multiple" and explain in Section IV. If unknown, cite Public Law or U.S. Code.

6b. Program title from CFDA. Abbreviate if necessary.

7. Use Section IV to provide a summary description of the project. If appropriate, i.e., if project affects particular sites as, for example, construction or real property projects, attach a map showing the project location.

8. "City" includes town, township or other municipality.

9. List only largest unit or units affected, such as State, county, or city.

10. Estimated number of persons directly benefiting from project.

11. Check the type(s) of assistance requested.

A. Basic Grant—an original request for Federal funds.

B. Supplemental Grant—a request to increase a basic grant in certain cases where the eligible applicant cannot supply the required matching share of the basic Federal program (e.g., grants awarded by the Appalachian Regional Commission to provide the applicant a matching share).

E. Other. Explain in Section IV.

12. Amount requested or to be contributed during the first funding/budget period by each contributor. Value of in-kind contributions should be included. If the action is a change in dollar amount of an existing grant

Item

(a revision or augmentation under item 14), indicate only the amount of the change. For decreases, enclose the amount in parentheses. If both basic and supplemental amounts are included, breakout in Section IV. For multiple program funding, use totals and show program breakouts in Section IV. 12a—amount requested from Federal Government. 12b—amount applicant will contribute. 12c—amount from State, if applicant is not a State. 12d—amount from local government, if applicant is not a local government. 12e—amount from any other sources, explain in Section IV.

13b. The district(s) where most of action work will be accomplished. If city-wide or State-wide, covering several districts, write "city-wide" or "State-wide."

14. A. New. A submittal for project not previously funded.

B. Renewal. An extension for an additional funding/budget period for a project having no projected completion date, but for which Federal support must be renewed each year.

C. Revision. A modification to project nature or scope which may result in funding change (increase or decrease).

D. Continuation. An extension for an additional funding/budget period for a project with a projected completion date.

E. Augmentation. A requirement for additional funds for a project previously awarded funds in the same funding/budget period. Project nature and scope unchanged.

15. Approximate date project expected to begin (usually associated with estimated date of availability of funding).

16. Estimated number of months to complete project after Federal funds are available.

17. Complete only for revisions (item 14c), or augmentations (item 14e).

18. Date preapplication/application must be submitted to Federal agency in order to be eligible for funding consideration.

19. Name and address of the Federal agency to which this request is addressed. Indicate as clearly as possible the name of the office to which the application will be delivered.

20. Existing Federal grant identification number if this is not a new request and directly relates to a previous Federal action. Otherwise, write "NA."

21. Check appropriate box as to whether Section IV of form contains remarks and/or additional remarks are attached.

APPLICANT PROCEDURES FOR SECTION II

Applicants will always complete either item 22a or 22b *and* items 23a and 23b.

22a. Complete if application is subject to Executive Order 12372 (State review and comment).

22b. Check if application is not subject to E.O. 12372.

23a. Name and title of authorized representative of legal applicant.

FEDERAL AGENCY PROCEDURES FOR SECTION III

Applicant completes only Sections I and II. Section III is completed by Federal agencies.

26. Use to identify award actions.

27 Use Section IV to amplify where appropriate.

28. Amount to be contributed during the first funding/budget period by each contributor. Value of in-kind contributions will be included. If the action is a change in dollar amount of an existing grant (a revision or augmentation under item 14), indicate only the amount of change. For decreases, enclose the amount in parentheses. If both basic and supplemental amounts are included, breakout in Section IV. For multiple program funding, use totals and show program breakouts in Section IV. 28a—amount awarded by Federal Government. 28b—amount applicant will contribute. 28c—amount from State, if applicant is not a State. 28d—amount from local government, if applicant is not a local government. 28e—amount from any other sources, explain in Section IV.

29. Date action was taken on this request.

30. Date funds will become available.

31. Name and telephone number of agency person who can provide more information regarding this assistance.

32. Date after which funds will no longer be available for obligation.

33. Check appropriate box as to whether Section IV of form contains Federal remarks and/or attachment of additional remarks.

☆ GPO : 1988 O - 461-275 (277)

Appendix C

OMB Approval No. 0348-0006

FEDERAL ASSISTANCE

1 TYPE OF SUBMISSION (Mark appropriate box)	☐ NOTICE OF INTENT (OPTIONAL) ☐ PREAPPLICATION ☒ APPLICATION	2 APPLICANT'S APPLICATION IDENTIFIER	a. NUMBER / b. DATE Year month day 19
		3 STATE APPLICATION IDENTIFIER NOTE TO BE ASSIGNED BY STATE	a. NUMBER / b. DATE ASSIGNED Year month day 19
		Leave Blank	

SECTION I—APPLICANT/RECIPIENT DATA

4. LEGAL APPLICANT/RECIPIENT
a. Applicant Name
b. Organization Unit
c. Street/P.O. Box
d. City
e. County
f. State
g. ZIP Code
h. Contact Person (Name & Telephone No.)

5. EMPLOYER IDENTIFICATION NUMBER (EIN)

6. PROGRAM (From CFDA)
a. NUMBER 84.203
MULTIPLE ☐
b. TITLE Star Schools Program

7. TITLE OF APPLICANT'S PROJECT (Use section IV of this form to provide a summary description of the project.)

8. TYPE OF APPLICANT/RECIPIENT
A—State; B—Interstate; C—Substate Organization; D—County; E—City; F—School District; G—Special Purpose District; H—Community Action Agency; I—Higher Educational Institution; J—Indian Tribe; K—Other (Specify):
Enter appropriate letter ☐

9. AREA OF PROJECT IMPACT (Names of cities, counties, states, etc.)

10. ESTIMATED NUMBER OF PERSONS BENEFITING

11. TYPE OF ASSISTANCE
A—Basic Grant; B—Supplemental Grant; C—Loan; D—Insurance; E—Other
Enter appropriate letter(s) A

12. PROPOSED FUNDING		13. CONGRESSIONAL DISTRICTS OF:	
a. FEDERAL	$ .00	a. APPLICANT	b. PROJECT
b. APPLICANT	.00		
c. STATE	.00	15. PROJECT START DATE Year month day 19	16. PROJECT DURATION Months
d. LOCAL	.00		
e. OTHER	.00	18. DATE DUE TO FEDERAL AGENCY ► Year month day 19	
f. Total	$ .00		

14. TYPE OF APPLICATION
A—New; B—Renewal; C—Revision; D—Continuation; E—Augmentation
Enter appropriate letter A

17. TYPE OF CHANGE (For 14c or 14e)
A—Increase Dollars; B—Decrease Dollars; C—Increase Duration; D—Decrease Duration; E—Cancellation; F—Other (Specify): NA
Enter appropriate letter(s)

19. FEDERAL AGENCY TO RECEIVE REQUEST
U.S. Department of Education

20. EXISTING FEDERAL GRANT IDENTIFICATION NUMBER

a. ORGANIZATIONAL UNIT (IF APPROPRIATE)
Application Control Center

b. ADMINISTRATIVE CONTACT (IF KNOWN)

c. ADDRESS
400 Maryland Avenue, S.W.
Washington, D.C. 20202

21 REMARKS ADDED ☐ Yes ☐ No

SECTION II—CERTIFICATION

22. THE APPLICANT CERTIFIES THAT► To the best of my knowledge and belief, data in this preapplication/application are true and correct, the document has been duly authorized by the governing body of the applicant and the applicant will comply with the attached assurances if the assistance is approved.

a. YES, THIS NOTICE OF INTENT/PREAPPLICATION/APPLICATION WAS MADE AVAILABLE TO THE STATE EXECUTIVE ORDER 12372 PROCESS FOR REVIEW ON: DATE _____

b. NO, PROGRAM IS NOT COVERED BY E.O. 12372 ☐
OR PROGRAM HAS NOT BEEN SELECTED BY STATE FOR REVIEW ☐

23. CERTIFYING REPRESENTATIVE
a. TYPED NAME AND TITLE
b. SIGNATURE

SECTION III—FEDERAL AGENCY ACTION

24. APPLICATION RECEIVED Year month day 19

25. FEDERAL APPLICATION IDENTIFICATION NUMBER

26. FEDERAL GRANT IDENTIFICATION

27 ACTION TAKEN
☐ a. AWARDED
☐ b. REJECTED
☐ c. RETURNED FOR AMENDMENT
☐ d. RETURNED FOR E.O. 12372 SUBMISSION BY APPLICANT TO STATE
☐ e. DEFERRED
☐ f. WITHDRAWN

28. FUNDING	
a. FEDERAL	$ .00
b. APPLICANT	.00
c. STATE	.00
d. LOCAL	.00
e. OTHER	.00
f. TOTAL	$ .00

29. ACTION DATE► Year month day 19

30. STARTING DATE Year month date 19

31. CONTACT FOR ADDITIONAL INFORMATION (Name and telephone number)

32. ENDING DATE Year month date 19

33. REMARKS ADDED ☐ Yes ☐ No

Appendix D

Assurances:

The applicant hereby assures and certifies that it will comply with the following special provisions of the Act:

(1) The finanical interest of the United States in the telecommunications facilities and equipment will be protected for the useful life of such telecommunications facilities and equipment.

(2) A significant portion of the facilities, equipment, technical assistance, and programming for which assistance is sought will be made available to elementary and secondary schools of local educational agencies which have a high percentage of children counted for purposes of Chapter 1 of the Act.

(3) All grant funds awarded will be used to supplement and not supplant funds otherwise available for the purposes of this program.

(4) On a schedule to be prescribed by the Secretary, a report shall be made, listing and discribing all available courses of instruction and materials to be offered by educational institutions and teacher training centers which will be transmitted over satellite, specifying the satellite on which each transmission will occur, and the time of the transmission.

Date _____

Authorized Representative _____

Title _____

Appendix E

Instructions for Part II—Budget Data

Section A—Detailed Budget

1. Salaries and Wages: Show salary and wages to be paid to personnel employed in the project. Fees and expenses for consultants must be included in line 6.

2. Fringe benefits: Include contributions for Social Security, employee insurance, pension plans, etc. Leave blank if fringe benefits applicable to direct salaries and wages are treated as part of the indirect cost.

3. Travel: Indicate the amount requested for travel for employees.

4. Equipment: Indicate the costs of nonexpendable personal property which has a useful life of more than two years and an acquisition cost of $500 or more per unit.

5. Supplies: Include the cost of consumable supplies and materials to be used in the project. These should be items which cost less than $500 per unit with a useful life of less than two years.

6. Contractural Services: Show the amount to be used for (1) procurement contracts (except those which belong on other lines such as supplies and equipment listed above); and (2) sub-grants.

7. Other: Indicate all direct costs not clearly covered by lines 1–6 above.

8. Total Direct Costs: Show totals for line 1–7.

9. Total Indirect Costs: Indicate the amount of indirect costs to be charged to the program or project. Explain under budget narrative the indirect cost rate and base.

10. Total Project Costs: Total lines 8 and 9.

Section B—Cost-Sharing

1. Project Income: Enter the dollar amount of estimated project income that will be generated by Federal funds if authorized by the Department of Education.

2. Non-Federal Funds: Enter the dollar amount of funds to be provided from other sources, e.g. State, local governments, private organizations, etc.

3. In-Kind Contributions: Enter the dollar value of donated services and goods to be used to support the program or project.

Section C—Estimate of Funding Needs

1. Enter the amount of Federal funds needs for the first year of the program or project.

2. Enter the amount of Federal funds needed to complete a multi-year program or project in its second year.

Section D—Estimated Unobligated Funds

1. Unobligated Federal Funds: Indicate the amount of funds remaining from the preceding fiscal year if the applicant is applying for continuation. Otherwise mark the space NA.

2. Unobligated non-Federal Funds: Indicate the amount of funds remaining from the preceding fiscal year that are from non-Federal sources. Otherwise mark the space NA.

3. Total: Show total for lines 1 and 2.

Section E—Budget Narrative

Attach a budget narrative that explains—

(a) the amounts for individual direct-cost categories that may appear to be out of the ordinary;

(b) the indirect cost rate and base; and

(c) the costs or contributions that are proposed for meeting matching requirements.

Appendix F

Special Budget Requirement

Provide a separate detailed budget for activities associated with each of the two areas described below, where applicable. Each such budget should employ the format set forth in Part II, as described above, that is required for the total budget:

(a) Instructional programming.

(Note: while individual applicants are not required to propose activities in this area, the Act requires that not less than 25% of the total funds appropriated be awarded by the Secretary to support such activities.)

(b) Facilities, equipment, teacher training or retraining, technical assistance or programming for local education agencies which are eligible to receive assistance under Chapter 1 of the Act.

(Note: while individual applicants are not required to propose activities in this area, the Act requires that not less than 50% of the funds appropriated are to be awarded by the Secretary to support such activities.)

BILLING CODE 4000-01-M

Appendix G

PART II
BUDGET INFORMATION

Section A - Budget Categories for Program Year (FY) 1988-89

1. Salary and Wages	$
2. Fringe Benefits	
3. Travel	
4. Equipment	
5. Supplies	
6. Contractual Services	
7. Other (itemize)	
8. Total Direct Costs (line 1 to 7)	
9. Total Indirect Costs	
10. Total Project Costs (lines 8 + 9)	

Section B - Cost Sharing

1. Program Income	$
2. Non-Federal Funds (State, local, etc.)	
3. In-Kind Contributions	

Section C - Estimate of Funding Needs

1. First Fiscal Year	$
2. Second Fiscal Year	

BILLING CODE 4000-01-C

Appendix H

Instructions For Part III—Application Narrative

Before preparing the application narrative an applicant should read carefully the description of the program including program priorities and the selection criteria the Secretary uses to evaluate applications. This information is included in this application notice. The narrative should encompass each function or activity for which funds are being requested and should:

1. Begin with an abstract that is a summary of the proposed project.

2. Describe the proposed project in light of each of the selection criteria in the order in which these criteria are listed in this notice.

3. Describe how the proposed project will meet any or all of the several priorities listed in this notice.

4. Describe the telecommunications facilities and equipment and technical assistance for which assistance is sought which may include: (a) The design, development, construction, and acquisition of State or multistate educational telecommunications networks and technology resource centers; (b) microwave, fiber optics, cable, and satellite transmission equipment; (c) reception facilities; (d) satellite time; (e) production facilities; (f) other telecommunications equipment capable of serving a wide geographic area; (g) the provision of training services to elementary and secondary school teachers (particularly teachers in schools receiving assistance under Chapter 1 of the Act in using the facilities and equipment for which assistance is sought); and (h) the development of educational programming for use on a telecommunications network.

5. In the case of an application for assistance for instructional programming, describe the types of programming which will be developed to enhance instruction and training.

6. Describe activities that will demonstrate that the telecommunications partnership has engaged in sufficient survey and analysis of the area to be served to ensure that the services offered by the telecommunications partnership will increase the availability of courses of instruction in mathematics, science, and foreign languages, as well as the other subjects to be offered.

7. Describe the teacher training policies to be implemented to ensure the effective use of the telecommunications facilities and equipment for which assistance is sought.

8. Describe how the proposed project will ensure that the financial interest of the United States in the telecommunications facilities and equipment will be protected for the useful life of such facilities and equipment. The interest of the United States in facilities and equipment is described in 34 CFR Part 74, Subpart O.

9. Describe how the proposed project will ensure that a significant portion of the facilities and programming for which assistance is sought will be made available to elementary and secondary schools of local educational agencies which have a high percentage of children counted for the purpose of Chapter 1 of the Act.

10. Describe the manner in which traditionally underserved students will participate in the benefits of the telecommunications facilities, equipment, technical assistance, and programming provided by the proposed project.

11. Describe how the applicant will ensure that grant funds are used to supplement and not supplant funds otherwise available for purposes of the Star Schools Program, as stated in the "Purpose of Program" section of this notice.

12. Include other pertinent information that may assist the Secretary in reviewing the application, including the scope and degree of services to be provided, who will render the telecommunication service, when it will be delivered, and the role of the interactive components. Justifications and specifications for equipment purchases should be clearly related to programs to be delivered as well as to existing facilities and resources. Applicants that apply for the production of instructional programming should be specific in the scope and sequence of content and production tasks to produce proposed courses of instruction. The application should enable reviewers to make clear linkages between the proposed budget and specific project tasks, operations, and service delivery.

Please limit the application narrative to 45 double-spaced typed pages, one side only.

Attachments to the narrative must include copies of documents associated with the applicant partnership, descriptions of partnership members, and agreements and letters of commitment associated with the assurances and priorities.

[FR Doc. 88-7423 Filed 4-4-88; 8:45 am]

BILLING CODE 4000-01-M

APPENDIX 3

MASSACHUSETTS NEEDS ASSESSMENT SURVEY RESULTS

Section 905(b)(3) of the Star Schools legislation requires that applicants engage in survey and analysis to ensure that the services offered "will increase the availability of courses of instruction in mathematics, science, and foreign languages, as well as the other subjects to be offered."

As a first step in obtaining this information for Massachusetts, MCET worked with the state Department of Education to develop a survey of public high school principals to determine:

- Which courses in mathematics, science, and foreign languages are being taught this year at Massachusetts high schools;
- Which courses schools would like to offer but did not teach this year due to insufficient enrollment, unavailability of teachers, or budgetary constraints;
- What types of teacher and administrator training are currently offered, and what types schools would like to offer;
- What telecommunications capabilities are available at schools, e.g. cable reception, television production, and television wiring.

The survey was reviewed by a number of superintendents, principals, and educators; experts within the Department of Education; and the Grants Committee of the MCET Board. The survey was mailed on February 23, 1988, to the 303 public high school principals, with copies to the superintendents. A cover letter was attached from Harold Raynolds Jr., the Massachusetts Commissioner of Education.

The majority of principals responded immediately to the survey. After follow-up calls to the non-responders, surveys were returned from 242 high schools, for a response rate of 80 percent. The complete tabulation of results is attached.

Except for the vocational schools, virtually all high schools in Massachusetts offer "core" subjects, such as Geometry and Algebra; Biology, Chemistry, and Physics; and four levels of Spanish and French. The courses that were most in demand fell into three categories:

- Specialized science and mathematics areas--including astronomy, probability/statistics, marine science, electricity, geography, and Pascal 1 and 2;

- Languages other than those commonly available--particularly Russian and German; and

- Advanced Placement courses in all subject areas, and other advanced courses, such as second-year physics.

The course most in demand was Russian. Currently, students in only 17 high schools (7 percent) have the option of learning Russian.

Overall, the demand for teacher and administrator training was high. Even in cases where principals indicated a type of training was available, they would often also check the box indicated need for additional training in that area. Demand was greatest for teaching skills (such as instructional strategies and classroom management) and administrative skills (such as program evaluation). Demand was also high for training in educational technologies, particularly software applications, and for curriculum development in remedial math and reading.

In the technology section, 92 percent of high schools indicated some TV equipment (cameras and VCRs), 79 percent are connected to cable television, and 48 percent have their classrooms wired for television. Eighty percent of schools use conventional broadcast television in classrooms, while only 10 percent currently use live, interactive television.

MASSACHUSETTS NEEDS ASSESSMENT SURVEY RESULTS

	Offer Course		Want Course	
	No.	Pct.	No.	Pct.
Total High Schools	303			
Responses	242	80%		
MATHEMATICS				
Career/Vocational Math	161	67%	20	8%
Geometry	237	98%	3	1%
Algebra 2nd year	234	97%	3	1%
Precalculus/Analysis	185	76%	9	4%
Calculus	177	73%	10	4%
Calculus AB - AP	103	43%	28	12%
Calculus BC - AP	43	18%	22	9%
Probability/Statistics	74	31%	47	19%
Trigonometry	194	80%	6	2%
Computer Literacy	181	75%	12	5%
Computer Science	117	48%	17	7%
Computer Programming	186	77%	11	5%
Computer Science A - AP	35	14%	35	14%
Computer Science B - AP	20	8%	23	10%
BASIC	170	70%	11	5%
Pascal	156	64%	32	13%
Pascal 2nd year	35	14%	39	16%
Other Mathematics	59	24%	8	3%
SCIENCE				
Biology	235	97%	4	2%
Biology 2nd year/ Anatomy & Physiology	174	72%	11	5%
Biology - AP	94	39%	38	16%
Marine Science/Biology	50	21%	43	18%
Zoology	14	6%	30	12%
Botany	18	7%	36	15%

	Offer Course		Want Course	
	No.	Pct.	No.	Pct.
Chemistry	229	95%	6	2%
Chemistry 2nd year	2	1%	2	1%
Chemistry - AP	75	31%	34	14%
Physics	230	95%	2	1%
Project Physics	48	20%	23	10%
Physics 2nd year	45	19%	25	10%
Physics B - AP	48	20%	33	14%
Physics C - AP	17	7%	18	7%
Physical Science	172	71%	7	3%
Physical Science 2nd year	23	10%	12	5%
Electricity/Electronics	103	43%	42	17%
Earth Science/Geology	176	73%	14	6%
Geography	79	33%	41	17%
Astronomy	38	16%	47	19%
Oceanography	45	19%	39	16%
Other Science	64	26%	3	1%
FOREIGN LANGUAGES				
English as a Second Language (ESL)	75	31%	10	4%
French 1	207	86%	7	3%
French 2	206	85%	8	3%
French 3	205	85%	6	2%
French 4	197	81%	4	2%
French 5	105	43%	12	5%
French Language - AP	47	19%	31	13%
French Literature - AP	12	5%	25	10%
Spanish 1	211	87%	6	2%
Spanish 2	211	87%	6	2%
Spanish 3	205	85%	6	2%
Spanish 4	192	79%	6	2%
Spanish 5	98	40%	19	8%
Spanish Language - AP	38	16%	28	12%
Spanish Literature - AP	10	4%	22	9%
Latin 1	164	68%	22	9%
Latin 2	151	62%	26	11%
Latin 3	98	40%	25	10%
Latin 4	67	28%	19	8%
Latin 5	8	3%	12	5%

	Offer Course		Want Course	
	No.	Pct.	No.	Pct.
Latin (Vergil) - AP	12	5%	17	7%
Latin (Catullus-Horace) - AP	2	1%	11	5%
Chinese 1	8	3%	25	10%
Chinese 2	2	1%	2	1%
Chinese 3	2	1%	9	4%
Chinese 4	2	1%	8	3%
Chinese 5	1	0%	6	2%
Greek 1	7	3%	17	7%
Greek 2	6	2%	13	5%
Greek 3	4	2%	5	2%
Greek 4	2	1%	4	2%
Greek 5	0	0%	4	2%
Italian 1	42	17%	18	7%
Italian 2	40	17%	14	6%
Italian 3	31	13%	10	4%
Italian 4	19	8%	8	3%
Italian 5	5	2%	3	1%
German 1	56	23%	31	13%
German 2	55	23%	29	12%
German 3	38	16%	23	10%
German 4	27	11%	16	7%
German 5	7	3%	9	4%
German Language - AP	5	2%	9	4%
Japanese 1	2	1%	22	9%
Japanese 2	1	0%	16	7%
Japanese 3	1	0%	8	3%
Japanese 4	0	0%	6	2%
Japanese 5	0	0%	4	2%
Portuguese 1	14	6%	9	4%
Portuguese 2	14	6%	6	2%
Portuguese 3	11	5%	4	2%
Portuguese 4	11	5%	4	2%
Portuguese 5	4	2%	2	1%
Russian 1	17	7%	50	21%
Russian 2	11	5%	39	16%
Russian 3	5	2%	12	5%

	Offer Course		Want Course	
	No.	Pct.	No.	Pct.
Russian 4	2	1%	10	4%
Russian 5	0	0%	4	2%
Other Languages	11	5%	2	1%
Other Subject Areas			40	17%
Students travel to take courses	60	25%		
TEACHING SKILLS				
Curriculum Development	109	45%	69	29%
Curriculum Implementation	63	26%	59	24%
Instructional Strategies	78	32%	95	39%
Classroom Management	54	22%	78	32%
Study Skills	24	10%	0	0%
Counseling/Guidance	49	20%	50	21%
ADMINISTRATIVE SKILLS				
Personnel Evaluation	74	31%	75	31%
Program Evaluation	36	15%	81	33%
Instructional Supervision	57	24%	66	27%
Organizational Development	29	12%	59	24%
ADVANCED COURSES IN SUBJECT AREAS				
Mathematics	21	9%	32	13%
Science	22	9%	28	12%
Foreign Languages	18	7%	22	9%
CURRICULUM DEVELOPMENT				
Mathematics	21	9%	32	13%
Remedial Mathematics	38	16%	58	24%
Science	22	9%	28	12%
Foreign Languages	18	7%	22	9%
Remedial Reading	43	18%	55	23%
Language Skills	47	19%	44	18%
Bilingual Education	18	7%	31	13%
Special Needs	55	23%	43	18%

	Offer Course		Want Course	
	No.	Pct.	No.	Pct.
EDUCATIONAL TECHNOLOGY				
Hardware Applications	64	26%	52	21%
Software Applications	84	35%	69	29%
Other Teacher and Administrator Training	20	8%	5	2%
TECHNOLOGY AVAILABLE AT SCHOOLS				
Can receive cable TV	191	79%		
Can send programming over cable	100	41%		
Classrooms wired	117	48%		
TV studio at school	24	10%		
Access to TV studio	78	32%		
Cameras, VCRs at school	222	92%		
Satellite reception	16	7%		
Microcomputers/modems	72	30%		
Local Area Network	22	9%		
Computer network to other locations	15	6%		
Other	16	7%		
USED FOR COURSES				
Conventional TV/videotape	194	80%		
Live, interactive TV	25	10%		
one-way video	9	4%		
two-way video	7	3%		
Microcomputers/modems	72	30%		
Computer network	15	6%		
Other	7	3%		
Additional Comments	20	8%		

APPENDIX 4

DOCUMENTATION OF SUPPORT AND SAMPLE LETTERS FROM THE REGION AND THE PRIMARY PARTNERS

Listing of individuals and organizations who have provided letters of support and/or commitment to working with the Northeast Star Schools Program (NSSP).

CONNECTICUT

Governor William A. O'Neill
Dr. Gerald N. Tirozzi, Commissioner, Connecticut Board of Education
Dr. Norma Foreman Glasgow, Commissioner, Connecticut Department of Higher Education

Connecticut State University

Bridgeport Public Schools
Consolidated School District of New Britain
Hartford Public Schools
New Haven Public Schools
Waterbury Public Schools

MAINE

Governor John R. McKernan, Jr.
Honorable George J. Mitchell, United States Senate
Honorable Joseph E. Brennan, House of Representatives, Congress of the United States
Honorable Olympia J. Snowe, House of Representatives, Congress of the United States
Hon. John L. Martin, Speaker of the House, House of Representatives, State of Maine
Hon. Nancy Randall Clark, Majority Leader, The Senate of Maine

Eve M. Bither, Commissioner, Department of Educational and Cultural Services
Carol Wishcamper, Chair, Maine State Board of Education
Dr. Robert L. Woodbury, Chancellor, University of Maine System

Eastern Maine Vocational Technical Institute
Foreign Language Association of Maine
Maine Chamber of Commerce & Industry
Maine School Boards Association
Maine School Management Association
Maine School Superintendents Association
Northern Maine Vocational Technical Institute
University of Maine
University of Maine at Augusta
University of Maine at Farmington
University of Maine at Fort Kent
University of Maine at Machias
University of Maine at Presque Isle
University of Southern Maine

Carrabec School Administrative District No. 74
Freeport Public Schools
Islesboro School Dept.
Maine School Adm. Dist. No.9

School Adm. Dist. No. 10
Maine School Adm. Dist. No. 13
Maine School Adm. Dist. No. 14
School Adm. District No. 21
Maine School Adm. District No. 22
School Union 30
Maine School Adm. District No.33
Maine School Admin. Dist. No.42
School Union 43
Maine School Admin. Dist. No.56
Maine School Admin. Dist. No.59
Maine School Admin. Dist. No.71
School Union 93
School Union 106
School Union 108
Monhegan School, Monhegan Island
Waterville Public Schools

MASSACHUSETTS

Governor Michael S. Dukakis
Honorable Edward M. Kennedy, United States Senate
Honorable John F. Kerry, United State Senate
Honorable Chester G. Atkins, House of Representatives, Congress of the United States

Honorable William M. Bulger, President, Massachusetts Senate
Honorable George Keverian, Speaker, Massachusetts House of Representatives
Honorable Richard A. Kraus, Senate Chair, Joint Committe on Education, Arts and Humanities
Honorable Nicholas A. Paleologos, House Chair, Joint Committee on Education, Arts and Humanities

Harold Raynolds, Jr., Commissioner of Education, Massachusetts Department of Education
Dr. Franklyn G. Jenifer, Chancellor, Massachusetts Board of Regents of Higher Education

Babson College
BBN Laboratories Incorporated
Boston University
Bristol Community College
Cape Cod Community College
Center for Field Studies and Services, College of Education, University of Lowell
The Center for Mathematics, Sciences and Technology in Education, Lesley College
Center for the Study of the Future, Salem State College
Center for Teaching and Learning, University of Massachusetts at Boston
Centers of Excellence Corporation
Chapter 1 Computer Cooperative Center
Digital Equipment Corporation
Education Committee, Greater Boston Chamber of Commerce
Education Development Center, Inc.
Emerson College
Field Center for Teaching and Learning, Bridgewater State College
Fitchburg State College
Five Colleges, Inc.
GTE Laboratories Incorporated
Greenfield Community College
Hampshire College

Harvard University
Holyoke Community College
International Coordinating Council
Massachusetts Association for Educational Media
Massachusetts Association of Secondary School Administrators
Massachusetts Computer Using Educators
Massachusetts General Hospital
Massachusetts Federation of Teachers
Massachusetts Institute of Technology (MIT)
Massachusetts Microelectronics Center, Mass. Tech. Park Corporation
Massachusetts Secondary School Admininstrators Association, Inc.
Massachusetts Teachers Association
Massasoit Community College
Middlesex Community College
Mount Wachusett Community College
New England Aquarium
New England Telephone
Newbury College
North Adams State College
North Shore Community College
Northeastern University
Office of International Trade/Investment, Commonwealth of Massachusetts
Palmer & Dodge
Quinsigamond Community College
Radcliffe College
Southeastern Massachusetts University
Springfield Technical Community College
University of Lowell
University of Massachusetts at Amherst
University of Massachusetts
Wellesley College
Wheaton College
Worcester Consortium for High Education
Worcester Polytechnic Institute

Assabet Valley Collaborative
Cambridge Public Schools
Boston Public Schools
Norwood Public Schools
Walpole Public Schools
Wellesley Public Schools
French River Education Center
Hampshire Educational Collaborative
Middleborough Public Schools, School Committee
SEEM Collaborative
South Berkshire Education Collaborative
South Coast Educational Collaborative, Computer Technology Center
South Shore Educational Collaborative
The Education Cooperative

NEW HAMPSHIRE

Governor John H. Sununu
Dr. John T. MacDonald, Commissioner of Education, State of New Hampshire
Dr. Claire A. Van Ummersen, Chancellor, University System of New Hampshire

National Education Association-New Hampshire
University of New Hampshire
City of Manchester School District

NEW YORK

Governor Mario M. Cuomo
Senator Kenneth P. LaValle, Vice Chairman, Legislative Commission on Science and Technology, New York State Senate

Dr. Thomas Sobol, Commissioner, New York State Department of Education
Dr. Jerome B. Komisar, Acting Chancellor, State University of New York
Vincent Tese, Commissioner, New York State Department of Economic Development

Diocese of Brooklyn
New York Network, State University of New York

RHODE ISLAND

Dr. J. Troy Earhart, Commissioner, Rhode Island Department of Education
Eleanor M. McMahon, Commissioner, Rhode Island Office of Higher Education

Rhode Island Higher Education Cable Television Council
Rhode Island College
Roger Williams College
Barrington Public Schools
Bristol Public Schools
Middletown Public Schools
Portsmouth Public Schools
Tiverton Public Schools
Warren Public Schools

VERMONT

Governor Madeleine M. Kunin
Dr. Richard Mills, Commissioner, Vermont State Department of Education
Dr. Charles I. Bunting, Chancellor, Vermont State Colleges System Office

University of Vermont
Chittenden South Supervisory School District

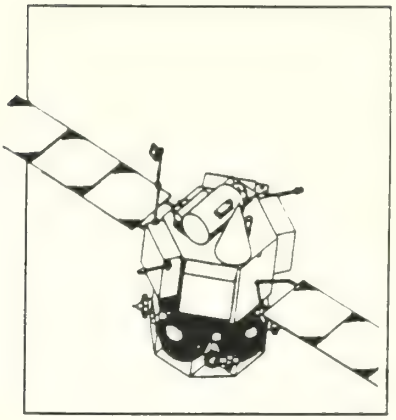
REGIONAL

New England Association of School Superintendents
New England Board of Higher Education
New England Council
New England Governors' Conference
New England Telephone
The Regional Laboratory for Educational Improvement of the Northeast & Islands

APPENDIX 5

ABSTRACT

Northeast Star Schools Program

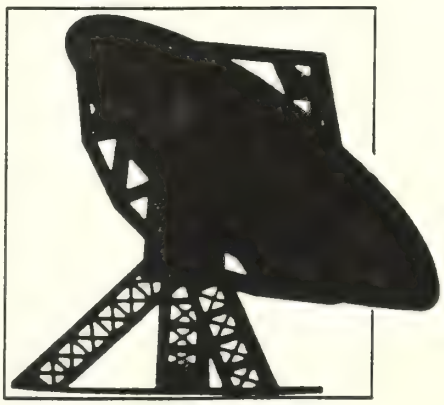


Connecticut
Maine
Massachusetts
New Hampshire
New York
Rhode Island
Vermont



Submitted to:
The United States Department of Education
June 15, 1988

by the:
Massachusetts Corporation for Educational Telecommunications (MCET)



ABSTRACT

(By Selection Criteria)

PURPOSE

The seven states of the Northeast -- Connecticut, Maine, Massachusetts, New Hampshire, New York, Rhode Island, and Vermont -- have joined with the Massachusetts Corporation for Educational Telecommunications (MCET) to create a state-of-the-art interactive distance learning program to serve students and educators throughout the region. The purpose of the **Northeast Star Schools Program (NSSP)** is straightforward:

> To improve mathematics, science, and foreign language instruction for the region's school children by creating and sharing resources through an enduring interactive telecommunications network.

Our mission is to develop a richer educational environment -- an environment in which all schools in the Northeast, and particularly those defined as Chapter 1 schools, gain access to improved instructional resources in such critical areas as mathematics, science, and foreign languages -- through the use of interactive communications technology. To fulfill this mission, we will:

- **Build** the electronic "highway" needed to deliver interactive distance learning;
- **Develop and adapt** interactive distance learning resources to improve and supplement the materials currently available in the region's schools and classrooms;
- **Create** -- in close collaboration with teachers, students, policymakers, and other critical constituents -- an environment enabling the best of what distance learning can offer to take root and flourish;
- **Nurture** a coalition of states toward an enduring compact addressing their common educational, cultural, and economic goals through the use of an effective and abiding network; and
- **Ensure** the wise "investment" of Star Schools Program monies through a well-managed project that will have demonstrable impact on the quality of education throughout the region in the first year of operation and serve as a model for others throughout the country.

NEED

The Northeast's economic base has shifted dramatically over the past 25 years. A traditional economic bellwether for the nation, we have moved from a blue-collar manufacturing and limited agricultural environment to an increasingly technological and

professional economy. Just as the Northeast led the nation's tumultuous entry into the industrial era, it is currently at the forefront of America's advance into the information age -- an economic era in which success depends upon an investment in learning, knowledge, information and skill. According to the U.S. Department of Labor statistics:

- The top three states in high-technology jobs as a percentage of all new jobs created between 1975 and 1982 were Massachusetts, New Hampshire, and Vermont -- five of the seven Northeast states placed in the top ten; and
- The percentage of northeastern workers employed in professional, managerial, technical and precision production jobs is 9% higher than the national average.

At the same time, we face a rapidly dwindling workpool. While it is projected that the national college-age population will decrease by 26% between 1979 and 1991, the decline projected in Massachusetts is 43%. Clearly, the Northeast's current economic prosperity cannot be sustained without a highly skilled workforce.

Yet, the educational systems upon which our economic future depends have not kept pace with these needs. Whether due to a lack of trained teachers or underfunded school budgets, we, like the rest of the nation, are not adequately preparing our students for the demands of the modern workplace or higher education.

In preparing this Star Schools proposal, MCET undertook an extensive assessment of the math, science, and foreign language needs of schools, teachers and students in the Northeast region. Despite the presence of outstanding educational, scientific, cultural and other learning resources throughout the region, we found that:

- Declining enrollments, diminished fiscal resources, and teacher shortages have led to a significant reduction in the number of courses available in math, science, and foreign languages in the Northeast -- the very subjects most crucial to our economy;
- Many math, science, and foreign language teachers are either inadequately prepared to teach these subjects or lack opportunities to upgrade their knowledge and develop new skills; moreover, few graduates are entering the math, science, and foreign language teaching fields;.
- The problems in mathematics, science, and foreign language instruction are most severe in urban schools and isolated rural schools;
- Teachers lack the skills and knowledge to take full advantage of available distance learning resources; and

- Few students are reached by the region's limited existing distance learning programs; many could benefit from an advanced, coordinated, regionwide telecommunications network.

Academic, industry and government leaders in the Northeast recognize the threat these educational problems pose to our region and to the entire nation. They agree that, for the sake of our economic security, we must have a well-trained workforce. And they have concluded that we cannot afford to tolerate deep disparities between "have" and "have not" schools, nor can we continue to justify "doing without" quality programs in mathematics, science and foreign language instruction.

MCET and its collaborators in the Northeast Star Schools Program believe that:

- By bringing together and mobilizing our institutions of higher learning, our industrial community, government, and our best teachers, we can pool our formidable resources to improve the instructional capabilities of our schools; and

- The immense power of advanced telecommunications resides in its ability to overcome geographic barriers, to accelerate the diffusion of information and knowledge, and as a result, to begin to erase the disparities of instructional quality through the effective sharing of educational resources.

It is in response to the problems facing our region -- and the recognition of the immense role that telecommunications can play in addressing them -- that the seven states of the Northeast have joined together to seek the support of the U.S. Department of Education for a two-year Star Schools demonstration program.

PLAN OF OPERATION

In developing a plan to address our educational needs, we have defined a set of four goals to be accomplished by the Northeast Star Schools Program during the two-year demonstration period.

Goal 1: **To build an enduring multi-state electronic "highway" -- the Northeast Educational Telecommunications Network.** The NSSP will draw on and bridge existing and new telecommunications capacities throughout the seven-state region to develop an interactive, satellite-based demonstration telecommunications network -- The Northeast Educational Telecommunications Network (NETN). Seven compatible and strategically located satellite uplinks and a terrestrially-based "feeder network" will enable a maximum number of institutions across the Northeast to originate live interactive programming. Receiving facilities located at schools and local cable television systems -- along with user-friendly classroom audio-visual systems -- will enable hundreds of classrooms to participate in new interactive learning experiences.

Goal 2: **To provide educators throughout the Northeast region with interactive Distance Learning Programs and other resources designed to improve instruction in mathematics, science, and foreign languages for K-12 students, with special emphasis on serving Chapter 1 schools.** The NSSP has identified 12 excellent initial Distance Learning Projects from across the region including such subjects as:

MATHNET	Discrete Math
Science Lab	Applied Biotechnology
High School Physics	A Foreign Language Institute
Russian Language Experience	Introduction to Japanese

All of the NSSP Distance Learning Projects will: be interactive; address curricular and teacher training needs in mathematics, science, and foreign languages; be developed in consultation with classroom teachers; serve Chapter I eligible schools; include teacher training components; and be regionally available within two years.

Goal 3: **To provide the technical assistance and training necessary to ensure the successful use of the Network and the Distance Learning Programs by the Star Schools.** Technical assistance and training will be provided to ALL Distance Learning Projects and Star Schools, including training in: network use; the development and implementation of high-quality distance learning programs in the areas of math, science, and foreign languages; the adaptation and dissemination of programs;and the evaluation of programming.

Goal 4: **To develop and implement a long-range plan to sustain and expand the Northeast Educational Telecommunications Network.** The NSSP, the MCET Board of Directors and the Regional Advisory Committee, are committed to the creation of an enduring, stable system that will continue to serve the educational and informational needs of the region. During the two years of proposed Star Schools funding, the Regional Advisory Committee will focus much of its attention on accomplishing this goal in order to ensure the long-standing stability of our regional network.

MANAGEMENT

MCET will administer and operate the program through its Executive Director (principal investigator under the proposal) and guidance by the Regional Advisory Committee, comprised of the chief K-12 and higher education officials from each state. The Star Schools Project Director, reporting to MCET's Executive Director, will have primary responsibility for the overall operations of the program and supervision of its staff and subcontractors. Technical and Teacher Advisory Committees and State Coordinators will provide guidance and support to the Project Director and staff. The activities and tasks of the project are divided among the following six functional categories: Project Management, Educational Resources, System Operations, Network Engineering, Planning and Development, and Business and Finance.

KEY PERSONNEL

The Proposal provides detailed information on the outstanding professional personnel offered in this application.

MCET's Executive Director, Richard A.Borten, will be responsible for all aspects of administration, policy development, and program implementation. He has held a wide range of senior management positions in government, and has served as a professor of administrative and consumer law. Mr. Borten has a solid command of both the policy and technical environments, and has steered the planning and design of the Northeast Educational Telecommunications Network and the NSSP.

Dr. Inabeth Miller, the NSSP Project Director, is currently Head of Educational Outreach at the Boston Museum of Science. Her background includes Executive-level management experience and a strong knowledge of learning technologies.

Dr. Alfred A. Pandiscio, the Manager for Network Engineering, is currently the Associate Director for Telecommunications Engineering in Harvard University's Office for Information Technology and a professor of Electrical Engineering at Harvard.

Dr. J. Lynn Griesemer, Coordinator of Northeast Star School Planning and Proposal development effort. Her leadership and management talents will continue to be a creative and powerful resource as a Senior Consultant in the implementation phase of this program. She has extensive professional experience spanning elementary, secondary, and higher education, business and industry, public service and the non-profit sector.

Dr. Edmund T. Cranch, Acting Chairman of the Regional Advisory Committee, is the Granite State Distinguished Professor at University of New Hampshire. A well-known advocate of educational telecommunications, Dr. Cranch is the former President of the Wang Institute of Graduate Studies, former President of the Worcester Polytechnic Institute and former Dean of Engineering at Cornell University

EVALUATION PLAN

The NSSP is committed to conducting ongoing self-assessment and evaluation to continuously provide information about our progress and impact. During the program's two years, the evaluation activities will concentrate on determining how well the NSSP is achieving its mission and purpose through its four goals.

A unique feature of the NSSP evaluation of the Distance Learning Projects is an innovative "visual-verbal" evaluation model. This evaluation model was developed by Mary Alice White of Teachers College, Columbia University. Dr. White will implement this model with the Distance Learning Projects on behalf of the NSSP and will serve as a senior evaluation consultant. The NSSP views the application of the visual-verbal model as a rare opportunity to contribute to the development of a cutting-edge evaluation

method tailored specifically to the needs and concerns of the NSSP.

ADEQUACY OF RESOURCES

The Massachusetts Corporation for Educational Telecommunications will spearhead an effort that mobilizes numerous agencies across the region. The sum of these many parts synthesizes the talents, skills, resources, and commitment of the foremost experts and institutions in the region. MCET has a distinguished track record of providing technical assistance and brokering services for interactive telecommunications programs and distance learning resources. It has demonstrated its leadership and administrative capability by convening the seven states in a joint planning effort and developing this proposal.

The state education departments of Connecticut, Maine, Massachusetts, New Hampshire, New York, Rhode Island, and Vermont are MCET's seven primary partners. In addition there are three categories of collaborators: (1) the producers of the 12 Distance Learning Projects; (3) the four subcontracting agencies that will provide technical assistance both to the project office and in the field; and (4) the seven institutions operating the network's satellite uplinks.

BUDGET

We propose a Star Schools program with a request for $10,000,000 of federal funds. During Year 1 we offer a approximately $6,500,000 or 39% match of the total program costs which is $16,313,918. In addition $8,500,000 or 85% is allocated to equipment, programming, teacher training, and technical assistance that will directly benefit Chapter I eligible schools. We are pleased to offer a budget that allocates almost equal amounts for building the Northeast Telecommunications Network (Goal 1: $3,433,352 or 34%) and provides distance learning programs (Goal 2: $3,382,138 or 34%) to the children and teachers of the region. Our technical assistance and training support, which will help us realize the greatest potential of this opportunity, carries significant value (Goal 3: $1,700,000 or 17%). Ensuring the wise investment through long range planning and management completed our request for federal support (Goal 4: $1,484,510 or 15%).

Reprinted 7/88

APPENDIX 6

[Similar Matter Filed During Past Session — See Senate No. 220 of 1987.]

SENATE . . . . . No. 201

By Mr. Boverini, a petition (accompanied by bill, Senate, No. 201) of Walter J. Boverini, John W. Olver, Stanley C. Rosenberg and Salvatore R. Albano for legislation relative to membership on the board of directors of the Massachusetts Corporation for Educational Telecommunications. Education.

The Commonwealth of Massachusetts

In the Year One Thousand Nine Hundred and Eighty-Eight.

AN ACT RELATIVE TO MEMBERSHIP ON THE BOARD OF DIRECTORS OF THE MASSACHUSETTS CORPORATION FOR EDUCATIONAL TELECOMMUNICATIONS.

Be it enacted by the Senate and House of Representatives in General Court assembled, and by the authority of the same, as follows:

The second paragraph of section 3 of Chapter 560 of the Acts of 1982 is hereby amended by striking out said paragraph and inserting in place thereof the following new paragraph: —

MCET shall be governed and its powers exercised by a board of directors which shall consist of nineteen directors and shall be representative of the racial, ethnic and cultural diversity of the commonwealth, the commissioner of administration, the secretary of economic development and manpower affairs, the commissioner of the department of education, the chancellor of the board of regents of higher education, the president of the University of Massachusetts, the president of the WGBH Educational Foundation, the Chairman of the advisory council of MCET and twelve persons appointed by the governor, three of whom shall be presidents of private institutions of higher education in the commonwealth, one of whom shall be the president of a Massachusetts state college, one of whom shall be the president of a Massachusetts community college, one of whom shall be a representative appointed from a list of at least three nominees of the Massachusetts Municipal Association, one of whom shall be the superintendent of a kindergarten through twelfth grade local public school district in the commonwealth and five of whom shall be bona fide representatives of other major sectors significantly affected by MCET including representatives of business, high technology and telecommunications sectors of the Massachusetts economy. Each member appointed by the governor shall serve for a term of seven years and thereafter until his or her successor is appointed, except that in making the initial appointments, the governor shall appoint one member to serve for two years, two to serve for thre yeras, two to serve for four years, two to serve for five years, two to serve for six years and two to serve for seven years. Any person appointed to fill a vacancy in the office of a member of the board shall be appointed in a like manner and shall serve for the remainder of the unexpired term. Any appointed member shall be eligible for reappointment, and may be removed from his or her office by the governor for cause. Nine directors shall constitute a quorum and the affirmative vote of the majority of the directors present and eligible to vote shall be necessary for any action to be taken by the board. The directors shall serve without compensation, but shall be entitled to reimbursement for actual and necessary expenses incurred in the performance of their duties. The board shall meet no less than four times each year, and shall have final authority over the activities of MCET.

APPENDIX 7

Peat Marwick

Certified Public Accountants

Peat Marwick Main & Co.
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INDEPENDENT AUDITORS' REPORT

The Board of Directors
Massachusetts Corporation for
Educational Telecommunications:

We have audited the accompanying balance sheets of Massachusetts Corporation for Educational Telecommunications as of June 30, 1988 and 1987, and the related statements of support, revenue and expenses and changes in fund balance, and changes in financial position for the years then ended. These financial statements are the responsibility of the Company's management. Our responsibility is to express an opinion on these financial statements based on our audits.

We conducted our audits in accordance with generally accepted auditing standards. Those standards require that we plan and perform the audit to obtain reasonable assurance about whether the financial statements are free of material misstatement. An audit includes examining, on a test basis, evidence supporting the amounts and disclosures in the financial statements. An audit also includes assessing the accounting principles used and significant estimates made by management, as well as evaluating the overall financial statement presentation. We believe that our audits provide a reasonable basis for our opinion.

In our opinion, the financial statements present fairly, in all material respects, the financial position of Massachusetts Corporation for Educational Telecommunications at June 30, 1988 and 1987, and the changes in its fund balance for the years then ended, in conformity with generally accepted accounting principles.

Peat Marwick Main & Co.

September 28, 1988

MASSACHUSETTS CORPORATION FOR EDUCATIONAL TELECOMMUNICATIONS

Balance Sheets

June 30, 1988 and 1987

	1988	1987
Assets		
Current assets:		
Cash and cash equivalents	$ 256,923	592,749
Accounts receivable	39,397	19,005
Interest receivable	1,477	2,927
Prepaid expense	23,072	21,431
Total current assets	320,869	636,112
Property and equipment	42,584	36,591
Less accumulated depreciation	18,456	10,538
	24,128	26,053
	$ 344,997	662,165
Liabilities and Fund Balance		
Current liabilities:		
Accounts payable	84,671	18,172
Accrued expenses	45,386	30,435
Estimated payroll taxes payable	2,077	1,006
Deferred restricted support	22,872	20,358
Total current liabilities	155,006	69,971
Fund balance	189,991	592,194
	$ 344,997	662,165

See accompanying notes to financial statements.

MASSACHUSETTS CORPORATION FOR EDUCATIONAL TELECOMMUNICATIONS

Statements of Support, Revenue and Expenses
and Changes in Fund Balance

Years ended June 30, 1988 and 1987

	1988			1987		
	Unrestricted Funds	Donor Restricted Funds	Total	Unrestricted Funds	Donor Restricted Funds	Total
Support and revenue:						
Grant revenue	$ 507,750	332,543	840,293	707,500	491,949	1,199,449
Interest income	26,705	-	26,705	37,199	-	37,199
Consulting fees	-	-	-	10,500	-	10,500
Program income	77,227	-	77,227	24,027	-	24,027
Total support and revenue	611,682	332,543	944,225	779,226	491,949	1,271,175
Expenses:						
General and administrative costs	1,013,885	-	1,013,885	352,835	-	352,835
Operating costs	-	332,543	332,543	-	491,949	491,949
	1,013,885	332,543	1,346,428	352,835	491,949	844,784
Excess (deficiency) of revenue over expenses	(402,203)	-	(402,203)	426,391	-	426,391
Fund balance, beginning of year	592,194		592,194	165,803		165,803
Fund balance, end of year	$ 189,991		189,991	592,194		592,194

See accompanying notes to financial statements.

MASSACHUSETTS CORPORATION FOR EDUCATIONAL TELECOMMUNICATIONS

Statements of Changes in Financial Position

Years ended June 30, 1988 and 1987

	1988	1987
Resources provided from:		
Excess of revenue over expenses	$ -	426,391
Add charge not affecting resources:		
Depreciation	7,918	5,860
Total resources provided from operations	7,918	432,251
Increase in accounts payable	66,499	1,515
Increase in accrued expenses	14,951	6,947
Increase (decrease) in estimated payroll taxes payable	1,071	(51,274)
Increase in deferred restricted support	2,514	9,675
Total resources provided	92,953	399,114
Resources used:		
Excess of expenses over revenue	402,203	-
Increase in accounts receivable	20,392	19,005
Increase (decrease) in interest receivable	(1,451)	1,758
Increase in prepaid expenses	1,641	18,467
Acquisition of property and equipment	5,994	14,612
Total resources used	428,779	53,842
Increase (decrease) in cash and cash equivalents	$ (335,826)	345,272
Cash and cash equivalents, beginning of year	$ 592,749	247,477
Cash and cash equivalents, end of year	256,923	592,749
Increase (decrease) in cash and cash equivalents	$ (335,826)	345,272

See accompanying notes to financial statements.

MASSACHUSETTS CORPORATION FOR EDUCATIONAL TELECOMMUNICATIONS

Notes to Financial Statements

June 30, 1988 and 1987

(1) Organization

Massachusetts Corporation for Educational Telecommunications (MCET), a quasi-public corporation, was created by the state legislature in December 1982 under Chapter 560 of the Acts of 1982. MCET's purpose is to develop a statewide telecommunications network to meet the telecommunications needs of various public and private organizations within the Commonwealth of Massachusetts. MCET is supported by a grant from the Commonwealth of Massachusetts and contributions, grants, gifts and bequests from the private sector. Although MCET is placed within the University of Massachusetts, it is not subject to the control of the University or any other state agency within the Commonwealth. MCET is governed by an independent board of directors; twelve members are appointed by the Governor of the Commonwealth and six members are designated by the Massachusetts legislature.

(2) Summary of Significant Accounting Policies

Fund Accounting

To ensure adherence to limitations and restrictions placed on available resources, the accounts are maintained in accordance with the principles of fund accounting. Those funds restricted as to purpose and use are accounted for separately from funds available for general corporate use. Donor restricted funds represent funds restricted by the donor for particular development purposes and are deemed to be earned and reported as support when MCET has incurred expenditures in compliance with the specific restrictions. Such amounts received but not yet earned are reported as restricted deferred support. Unrestricted funds represent the portion of expendable funds that are available for all MCET expenses.

Property and Equipment

Property and equipment are stated at cost, or in instances of donation, at fair market value. Depreciation is recorded using the straight-line method over the estimated useful life of the assets.

Income Taxes

MCET, as an instrumentality of the Commonwealth, is exempt from Federal and state income taxes under IRC Section 115(1).

Donated Services

During part of 1987, MCET received donated office space and support services from the Commonwealth of Massachusetts. Donated services are recorded on the financial accounts when a fair value for such services can be ascertained and when the services donated replace services which would otherwise be provided by employees. No income or expense was recorded in the accompanying financial statements as the value of such services could not be readily ascertained.

(Continued)

MASSACHUSETTS CORPORATION FOR EDUCATIONAL TELECOMMUNICATIONS

Notes to Financial Statements

Revenue Recognition

Support and revenue in the form of grants and donations are recorded when use of the cash or other donated assets is available to MCET.

Estimated Payroll Taxes Payable

The Internal Revenue Code Section 3121(u) requires that all employees of public instrumentalities hired after March 31, 1986 be subject to the hospital insurance employment tax. The provision for estimated payroll taxes represents the estimated liability for both employer and employee contributions. The provision for estimated payroll taxes for the year ended June 30, 1988 and 1987 was $2,077 and $1,006, respectively.

In 1987, MCET received the IRS ruling confirming its status as a public instrumentality of the Commonwealth. Public instrumentalities are exempt from FICA taxes. The 1986 provision for estimated payroll taxes in the amount of $52,280 that represented the estimated liability of FICA taxes was reversed during 1987.

(3) Simplified Employee Pension Plan

MCET has adopted a simplified employee pension plan whereby a contribution equal to 10% of an employee's eligible wages (as defined by the plan) is contributed to a retirement account in that employee's name on a quarterly basis. Pension expense for the years ended June 30, 1988 and 1987 was $27,386 and $21,896, respectively.

(4) Leases

MCET's future minimum rental commitments under operating lease agreements for offices and equipment as of June 30 are as follows:

1989	$ 67,000
1990	50,000
1991	1,500
1992	-
1993	-

(Continued)

MASSACHUSETTS CORPORATION FOR EDUCATIONAL TELECOMMUNICATIONS

Notes to Financial Statements

(5) Restricted Grants

In September 1985, MCET received a grant from a local university to provide $1,250,000 to engage the services of a consultant in an effort to secure Federal support for the development of the telecommunications network and supporting facilities essential to this development. Consulting expenses charged to the grant were $332,543 and $491,949 in 1988 and 1987, respectively. MCET's agreement with the University provides for monthly payments of $41,667 for 30 months or completion of the project whichever is sooner. At June 30, 1988 the grant was completely funded.

(6) Property and Equipment

Property and equipment consisted of the following:

	June 30, 1988	June 30, 1987	Estimated Useful Life
Furniture and fixtures	$ 9,254	7,837	5 years
Office equipment	20,844	20,742	5 years
Computer equipment	12,486	8,012	5 years
	$ 42,584	36,591	

(7) Deferred Restricted Grants

Changes in deferred restricted grants in the donor restricted fund at June 30, 1988 are presented below:

Balance, beginning of year	$ 20,358
Additions:	
Grants	333,333
Investment income	1,724
	335,057
Deductions:	
Funds expended during the year	332,543
Balance, end of year	$ 22,872

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ANNUAL REPORT

FISCAL YEAR 1989

MASSACHUSETTS CORPORATION

FOR

EDUCATIONAL TELECOMMUNICATIONS



Message from the Chairman

On behalf of the Board of Directors of the Massachusetts Corporation for Educational Telecommunications (MCET), I am pleased to submit the Corporation's Annual Report for the 1989 Fiscal Year.

FY89 was a watershed year for MCET. In April of 1989, the Corporation filed with the Governor and the General Court a comprehensive Five Year Plan -- *Distance Learning for the Commonwealth's Future* -- for the development of a statewide educational telecommunications network. Despite enormous fiscal pressures facing the state, the Legislative leadership and Governor Dukakis demonstrated courage, farsightedness and a deep commitment to the Commonwealth's future by appropriating and approving for Fiscal Year 1989 funds which will enable MCET to begin to create a distance learning network pursuant to our Plan.

The proposed network will play a vital role in helping to address the state's critical need for improved education in an increasingly technical and professional economic environment. It will provide students, teachers and workers throughout Massachusetts with greater access to high quality learning resources.

As we note in our network development Plan, the Massachusetts economy -- which has led the nation into the information age -- depends on a well-educated workforce. To the extent that the Commonwealth lacks workers with adequate mathematical, science, technical and language skills, its ability to sustain a successful economy is at risk. Unaddressed, this deficiency in the labor force will only become greater.

Despite an abundance of outstanding educational resources in Massachusetts, many of our schoolchildren cannot get the courses they need, and many adult learners in the labor force lack access to continuing education and job training. Educational institutions -- faced with fiscal constraints, declining enrollments and a shortage of qualified teachers -- find it impossible to provide the expanding range of courses that students need. Indeed a great many communities are actually contracting the number of existing courses.

Every international study has emphasized the deficiency of American education compared to that of other nations. Ironically, Massachusetts has been doing less to address this problem than most of the other major industrial states.

Clearly, the challenge we face is to facilitate the sharing of the unparalleled resources that reside in our colleges and universities, research laboratories and industries -- and to make them accessible to the major portions of the population they rarely reach. As has been demonstrated in other states, and on a limited basis in Massachusetts, telecommunications can be an effective and cost-efficient way to meet this challenge. Through *distance learning*, students can have access to courses not otherwise available, teachers can update their training, and workers can obtain the skills they need in today's demanding economic environment.

The MCET network will allow students, teachers and workers to participate in *live, interactive instruction* originating at remote locations. At the same time, it will enable our educational institutions to expand their markets and reach new students. The network will employ the immense power of advanced telecommunications to overcome the barriers of distance, to accelerate the dissemination of information and knowledge, to share resources and to begin to erase the vexing disparities of instructional quality in Massachusetts.

MCET enters the 1990 Fiscal Year with a renewed commitment to collaborating with state and local government, teachers, institutions and businesses in developing a network which will provide exciting new learning opportunities.

Richard J. Snyder, Chairman
September 29, 1989

Table of Contents

Message from the Chairman i

ANNUAL REPORT 1

- Overview 1
- Network Development 2
- Promotional Brochure 6
- Technical Assistance Program 6
- Collaborative Projects 8
- Legislation 9
- Board of Directors and Advisory Council 9

APPENDICES 11

1. Promotional Brochure
2. Alternative Strategies for Network Development
3. Chapter 305 of the Acts of 1988
4. Board of Directors and Advisory Council

FISCAL YEAR 1989

ANNUAL REPORT

The Massachusetts Corporation for Educational Telecommunications (MCET) is an independent public corporation of the Commonwealth of Massachusetts established by Chapter 560 of the Acts of 1982. MCET's mission is to build and operate a statewide network to serve the educational and economic needs of a wide range of sectors - including schools, public and private higher education, health care, business and government.

OVERVIEW - FISCAL YEAR 1989

The Massachusetts Corporation for Educational Telecommunications entered the 1989 Fiscal Year optimistic that the federal government would approve and support its $20 million proposal for a Northeast Regional Educational Telecommunications Network. MCET had played a key role in the development of the federal "Star Schools Program Assistance Act"and was confident that its comprehensive proposal exceeded all the Act's criteria and requirements for federal funding of a highly innovative regional distance learning network.

Unfortunately, MCET was dismayed when, in September 1988, the Reagan Administration announced its decision not to fund the Corporation's application. However, thanks to the farsightedness of state leaders, and the commitment and tenacity of

MCET's Board of Directors and Staff, the Corporation ended FY 1989 with the Legislature's support for initial development of an educational telecommunications network.

In the closing hours of the 1989 Fiscal Year, the General Court enacted a FY90 appropriation providing $1.2 million for Year 1 development of a network pursuant to a detailed network Plan formulated by MCET and filed with the Governor and Legislative Leadership in April 1989.

NETWORK DEVELOPMENT

MCET spent much of FY 1989 formulating a detailed Plan for the creation and operation of a statewide distance learning network. The Plan, entitled "Telecommunications for the Commonwealth's Future -- A Plan for an Educational Telecommunications Network," was developed in close collaboration with a wide range of teachers, institutions, organizations and businesses. Its independently verifiable findings underscore both the urgent need for improved educational services and the crucial role advanced telecommunications can play in meeting that need.

The MCET Board of Directors approved the Plan, along with required subsidiary findings, in March, in accordance with the provisions of the Corporation's enabling statute, Chapter 560 of the Acts of 1982. Pursuant to statutory requirements, MCET

subsequently filed the Plan with the Governor, Senate President, Speaker of the House of Representatives, and the House and Senate Ways and Means Chairmen.

The MCET Plan responds to:

- The requirements of the Corporation's enabling legislation;
- The urgent educational and economic needs of the Commonwealth; and
- The need for a cost-effective response to the demand for expanded educational choices.

As described in detail in the Plan, the proposed network will cost $21.1 million for development and operations. MCET projects raising $10.3 million of this in non-state revenues, such as membership fees, and seeks $12.6 million form the state over the five year network development period. The Plan also describes the network activities and the educational and economic benefits they will engender.

MCET's Plan reflects the Corporation's strongly held belief that the economic security of Massachusetts -- perhaps more than any other state -- depends on a well-educated population. Governor Dukakis has noted, "*While implementing these technologies in our schools may be expensive, the cost of not implementing them will be even higher.*" Yet even with the Commonwealth's abundance of outstanding learning resources, educational institutions are increasingly unable to provide the courses and quality programs our students, teachers and workers need in today's increasingly technical, professional and international economy. Cited in the Plan is a recent comprehensive MCET study of

Massachusetts public high schools revealing that only a third offer advanced placement courses in chemistry, physics or computer science; only 23 percent offer German, 7 percent teach Russian and fewer than one percent offer Japanese. Even if individual schools could find and could afford enough teachers qualified in these subjects, they might never be offered because of low enrollments. Yet, through the proposed network -- and through the economies of scale achieved by sharing resources -- students at schools across the state could actively participate in such programs via live television transmissions.

MCET notes in its network development document that the challenge the Commonwealth faces is to facilitate the sharing of the unparalleled resources of our colleges and universities, research centers and industries -- and to make them accessible to the major portions of the population they never reach. Telecommunications is an effective, cost-efficient way to meet this challenge. Through distance learning, students can have access to courses not otherwise available, teachers can update their training, and workers can obtain new skills. Indeed, educational networks in other states have demonstrated that distance learning can respond to such critical educational problems, reaching even isolated rural and urban schools where problems are often most severe, and providing educational choices not otherwise available.

MCET believes its proposed network will not only meet these challenges, but will do so in a cost effective way. In fact, it may well be that, in view of the state's fiscal situation, advanced telecommunications may be the only feasible way to address these

problems. Rather than submit a Plan calling for investment in all new equipment and physical plant, MCET designed a system that takes advantage of the state's considerable existing telecommunications capacity. While a number of Massachusetts institutions have developed important communications capabilities, it is evident that the development and operation of the interactive statewide network proposed in the Plan are beyond the financial means of any single institution or consortium of institutions. MCET has found considerable existing transmission capacity, but very few facilities enabling schools, worksites and other locations to receive distance learning programming. Therefore, a major portion of the Plan's budget is for the acquisition and placement of satellite receiving equipment at schools, or preferably, at cable television systems which distribute programming to local institutions. This investment in receiving equipment includes easy-to-use interactive classroom audio-visual packages.

The proposed network can also provide the Commonwealth's renowned educational, medical and research institutions with a means of exporting information and education to other states and nations around the world.

MCET's network Plan notes that the Commonwealth demonstrated considerable vision in creating MCET in 1982; it foresaw the promise that modern communications technology holds for education. Unfortunately, since then, more than 30 states - including all of Massachusetts's sister states in the Northeast - have made significant investments in educational networks, as Massachusetts has fallen behind. Congress, in enacting Senator Kennedy's Star Schools Act, recognized the role networks can play in improving math,

science and foreign language instruction. The nation's major teaching organizations have called for "the major application of technology to education."

MCET is pleased to report that the Fiscal Year ended with the Legislature appropriating $1.2 million for FY90 for network development pursuant to the plan MCET had filed. This is particularly noteworthy given the Commonwealth's current fiscal problems; MCET's network development plan is one of the only new funding proposals adopted for FY90.

OTHER BUSINESS

PROMOTIONAL BROCHURE

To assist in the necessarily extensive marketing and promotion efforts associated with network development, MCET produced a brochure that describes the current state of educational telecommunications in the nation and describes MCET's approach to meeting the needs of Massachusetts. **[See Appendix 1]**

TECHNICAL ASSISTANCE PROGRAM

In its third year of operation, MCET's Technical Assistance Program (TAP) continued to use innovative telecommunications technologies to enhance educational opportunities for institutions. Among the FY89 TAP projects:

- **HealthNet**, a series of live interactive continuing education videoconferences for health care professionals, had a highly successful third year in which MCET again acted as broker and coordinator, but at no cost to the Corporation. MCET secured programming time on the national cable television channel, The Learning Channel, for the HealthNet programs in FY89.

- **Governor's Alliance Against Drugs**, a multi-site two-way videoconference, was coordinated by MCET in January 1989. This videoconference marked the fourth anniversary of an MCET-coordinated audioconference that had kicked off the Dukakis Administration's anti-drug campaign.

- In June MCET participated in the implementation of an international videoconference that was the culmination of **KITES**, a year-long classroom partnership between students in Lowell area middle schools and students in Karlsruhe, West Germany. The students had been communicating by computer over the year in a project supported by Digital Equipment Corporation, the University of Lowell, the West German state of Baden-Wurttemburg and the German Bundespost.

- The second annual **Northeast Distance Learning Conference: Strategies for Implementation** was held in Springfield April 13 and 14. MCET, along with the Massachusetts Department of Education, and education departments in New

York, Connecticut, Maine, New Hampshire, Rhode Island and Vermont sponsored the event that was attended by more than 400 educators, administrators and industry representatives.

As in previous years, these projects contributed to MCET's understanding of the concepts and issues that are critical to developing sustained local applications of advanced telecommunications.

COLLABORATIVE PROJECTS

During FY89 MCET helped bring together the New England Telephone Company (NET) and NYNEX with the administration of Bunker Hill Community College to discuss the development and implementation of joint telecommunications projects. NET and Bunker Hill are currently planning to interconnect the college with several area high schools to provide interactive educational programming to students and teachers.

Executive Director Richard Borten participated in several committees and working groups in FY89 concerned with improving the educational and economic environment through telecommunications. Mr. Borten met regularly with the Greater Boston Chamber of Commerce Educational Telecommunications Committee and the Telecommunications Group of the Governor's Export 90 Committee. The Export 90 Committee endorsed MCET's recommendation to make education an export product that would use telecommunications as its distribution means.

At the request of State Senator John A. Brennan, Chairman of the Special Committee on Electronic Media Access, MCET prepared a report outlining in detail the various technical options available to the Senate for distribution of televised coverage of its sessions. **[See Appendix 2, "Alternative Technical Strategies for Senate Television Coverage"]**

LEGISLATION

On December 1, 1988 Governor Dukakis signed into law Chapter 305 of the Acts of 1988, to protect members of the MCET Board of Directors from undue exposure under the state's Conflict of Interest Law, since many of the institutions that stand to benefit from development of the network are represented on MCET's Board. **[See Appendix 3, Chapter 305 of the Acts of 1988.]**

BOARD OF DIRECTORS AND ADVISORY COUNCIL

In FY89 University of Massachusetts President David Knapp stepped down as Chairman of the Corporation. Emerson College President Allen Koenig was elected Chairman at the FY89 Annual Meeting.

During the fiscal year Secretary of Economic Affairs Joseph Alviani resigned and was replaced by Grady Hedgespeth who assumed the ex-officio Board seat for the

secretariat. In addition, Middleborough School Superintendent Lincoln Lynch resigned and businessman William Cantor's term of service expired. Professor Frederick Royal, a Longmeadow Selectman, was appointed by Governor Dukakis to fill one of the Board positions designated for the Massachusetts Municipal Association.

Following the FY88 passage of legislation restructuring the MCET Advisory Council, Governor Dukakis appointed Council members. At its first meeting in March the Council elected Jack Luskin, Director of Training of the Work Environment Lab of the University of Lowell as its Chairman. As such, Mr. Luskin is designated to serve on the MCET Board of Directors. **[See Appendix 4, Board of Directors and Advisory Council, FY89.]**

ANNUAL AUDIT

Due to fiscal constraints and a concern that all available resources be devoted to network development efforts, the Board of MCET elected to forego contracting for the services of an independent auditing firm. Instead, MCET has requested that the FY89 Audit be performed by the state Auditor's Office. At the time of submission of this report the audit had not been completed.

APPENDIX 1

APPENDIX 2



Massachusetts
Corporation for
Educational
Telecommunications

Richard A. Borten
Executive Director

ALTERNATIVE STRATEGIES FOR SENATE TELEVISION COVERAGE

Prepared for
The Honorable John A. Brennan, Jr.
Massachusetts Senate

By the
Massachusetts Corporation for Educational Telecommunications
June 1, 1989

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A Public Corporation Established by the Commonwealth of Massachusetts

ALTERNATIVE TECHNICAL STRATEGIES
FOR SENATE TELEVISION COVERAGE

I. INTRODUCTION:

The Goal

This paper addresses the following goal:

> **To develop a <u>television network</u> that provides Massachusetts citizens with increased coverage of state Senate proceedings and activities.**

There are numerous television **<u>program</u>** alternatives that the Senate can consider to achieve this goal, including:

- Live gavel-to- gavel coverage;
- Weekly or biweekly videotaped highlights of Senate proceedings;
- Live, or videotaped "talk-shows" or interviews with Senators;
- Live programs with call-in opportunities for the public;
- Educational seminars about the Senate and legislative process;
- Electronic bulletin board service listing agendas, public hearings, publications available in the State House library, etc.;
- Video press conferences and crisis management.

Each of these program alternatives provides a different set of technical requirements for network development.

This report focuses on the **<u>technical alternatives for providing live, gavel to gavel coverage of the Senate</u>**, and is based on the following assumptions:

- Senate coverage must not be pre-empted or "bumped" by other programs;
- Coverage should reach the majority of Massachusetts homes; and
- Senate sessions are not predictably scheduled, <u>average</u> 20 hours/week, or approximately 1000 hours per year.

Section II discusses alternative transmission systems, and outlines the various technologies that can link the Senate chamber to Massachusetts citizens via television.

Section III provides a summary of options and identifies three alternative television network models for achieving the goal. One model described in this discussion - **Model C. - Shared Network Ownership and Control -** is particularly worthy of further examination and consideration. It suggests that the Senate share resources with the network proposed by MCET for the delivery of educational services to students, teachers and workers throughout the Commonwealth. Under such a configuration, it is possible that both educational (MCET) and civic (Senate) purposes would be addressed with minimal additional capital expenditure and maximum economies of scale.

[Please note that this report does not include a discussion of on-premises equipment such as television cameras, microphones, lights, etc.]

II. Technical Discussion of Alternatives: Components of a Transmission System

Television systems generally employ a mix of technologies. For example, in order to transmit a TV signal from the State House to homes throughout Massachusetts, the TV signal might:

- Travel "**point to point**" from the State House to a broadcast transmitter;

- Be broadcast from a "**point to multi-point**" system, i.e. from a transmitter (point) to many other locations throughout the state (multi-point); and/or;

- Be received and redistributed on a "**multi-point to multi-point**" system such as cable TV which receives many television signals (multi-point) and then retransmits them directly to homes (multi-point).

Selected technical alternatives for transmitting live, gavel-to- gavel coverage from the Senate are outlined below. They are grouped as point to point; point to multi-point; and multi-point to multi-point.

A. POINT TO POINT: FROM THE STATE HOUSE TO A BROADCAST TRANSMITTER

Microwaves and fiber optics are examples of point to point technologies used primarily to carry a signal from a program origination location (e.g., the Senate Chamber) to systems which can transmit the signal to many other locations.

Microwave transmissions require a line-of-sight between the origination point and the receiving location. Generally, microwave transmitters and receivers are mounted on roofs or towers. (Microwave transmitters used by the State Lottery and other agencies are located on the

McCormack and Saltonstall State Office Buildings.) It is most efficient to share microwave tower space with other users whenever possible. Once an FCC microwave license is secured and the equipment is purchased and installed, actual operating costs for a point-to-point microwave system are relatively low.

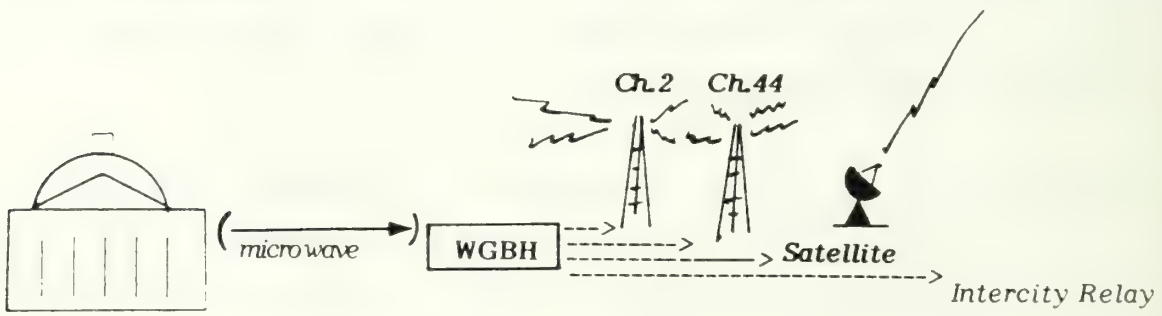
Fiber optics carry signals (in the form of light waves) through cables comprised of thin glass strands. Fiber optic technology is gaining widespread commercial acceptance, because it has very high capacity, provides privacy, and is unaffected by electrical and weather interference. Optical fibers can easily carry television signals. However, because fiber optic cables are very expensive to install in urban areas, it is advisable to obtain shared or leased use of existing fiber optic cables.

Alternatives for point to point links from the State House to a broadcast transmission system include:

1. **Microwave to WGBH:**

   WGBH operates a highly flexible broadcast facility from which it can transmit over its:

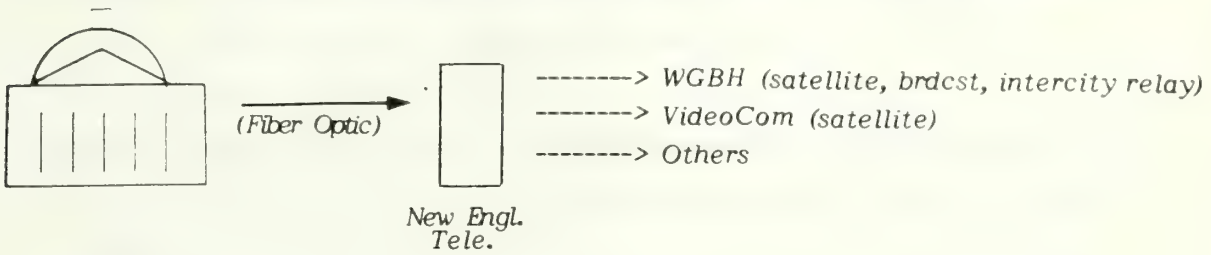
   - VHF TV Channel 2;
   - UHF Channel 44;
   - Two satellite "uplinks" (transmitters);
   - Two-way microwave relay system from Boston to WGBY in Springfield; as well as a two-way Boston-to-Springfield relay system owned by the House of Representatives.



WGBH currently operates a point to point microwave link to transmit coverage of the House of Representatives from the State House to the WGBH facility in Allston.

One advantage of linking to WGBH via microwave may be the opportunity to share facilities with the House. The ability to do so is dependent upon the specific placement of equipment and existing agreements.

2. **New England Telephone Company (fiber optics) to Various Transmission Facilities:**



The telephone company provides specially installed video transmission services for broadcasters, primarily via fiber optics. Fiber capacity could be leased (full time or as needed) from the State House to the telephone company's main switching point on Franklin Street, Boston. From there the Senate signal could be switched to one of several point to point links with broadcast transmitters. For example, approximately 120 Boston locations are linked to Franklin Street for broadcast quality video transmission, including commercial broadcasters; WGBH; and Videocom, Inc., a teleport (satellite transmitting facility) in Dedham.

Advantages to using telephone company service include the high technical quality of fiber optic transmission and the multiple transmission systems to which telephone systems can link.

The primary disadvantage of this option is cost -- both for installing and using the system. Use of telephone plant could be purchased in three ways:

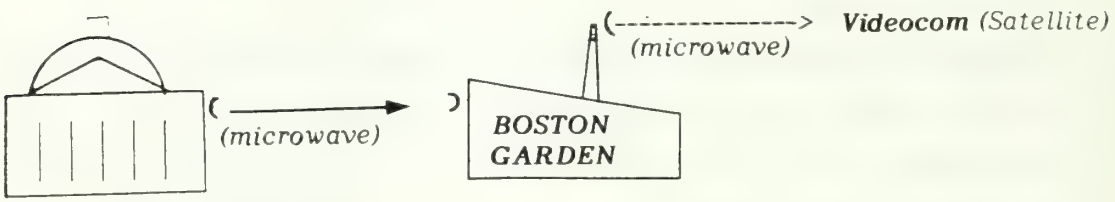
a. Occasional use: NET charges the regulated, published broadcast video rate for use of their lines, regardless of the client or application.

b. Special Assembly: It may be possible to arrange a special project with NET, which utilizes different, "non-broadcast" equipment for transmission. Such an arrangement could result in a new, published rate structure, with lower than broadcast fees.

c. Full-time channel lease: The Senate could lease a dedicated fiber channel to Franklin Street. Depending on the total number of hours of transmission, this may be the more efficient alternative.

(MCET has discovered a little-known statute which we believe permits the telephone company to provide the state with special discounts.)

3. **Microwave to Boston Garden:**



The New England SportsChannel operates a two-channel microwave link from the Boston Garden to Videocom Satellite Associates, a teleport in Dedham. One microwave channel is available weekdays until 5:15 pm. It is possible to lease time on this channel as needed, and it may be possible to lease the channel "full-time" (i.e. weekdays until 5:15 pm). It might also be possible to add a channel on the Boston Garden/Videocom link, using existing towers.

4. **Upstream Cable Television to WGBH or Videocom:**



Boston's cable television system provides the technical potential to originate and insert programs over its *Public Institutional Network (PIN)* from various institutional sites in the city. (Such program insertion is called "upstream" transmitting to the cable control center, or "headend"; programming sent from the headend to subscribers is called "downstream" transmitting.) Typically, this capacity is used for programs that are distributed on Boston cable channels. However, in addition to the ability to cablecast live in Boston, the Boston cable system's PIN is linked to WGBH and indirectly, through the network described above (II.A.3.), to Videocom. It cannot be assumed, however, that either "upstream" channels, or "downstream" channels are available without cost.

A possible disadvantage of this alternative is inferior technical quality. However, technical quality could be determined quite easily through a signal test.

5. **Microwave to an ITFS or Private Satellite Network:**

Use of this alternative depends on the ability to lease excess channel capacity from an ITFS or private satellite network. For example, such networks in the Boston area include:

- ITFS, or Instructional Television Fixed Service, refers to a broadcast microwave frequency that can be received on special antennas within line-of-sight and a 20-

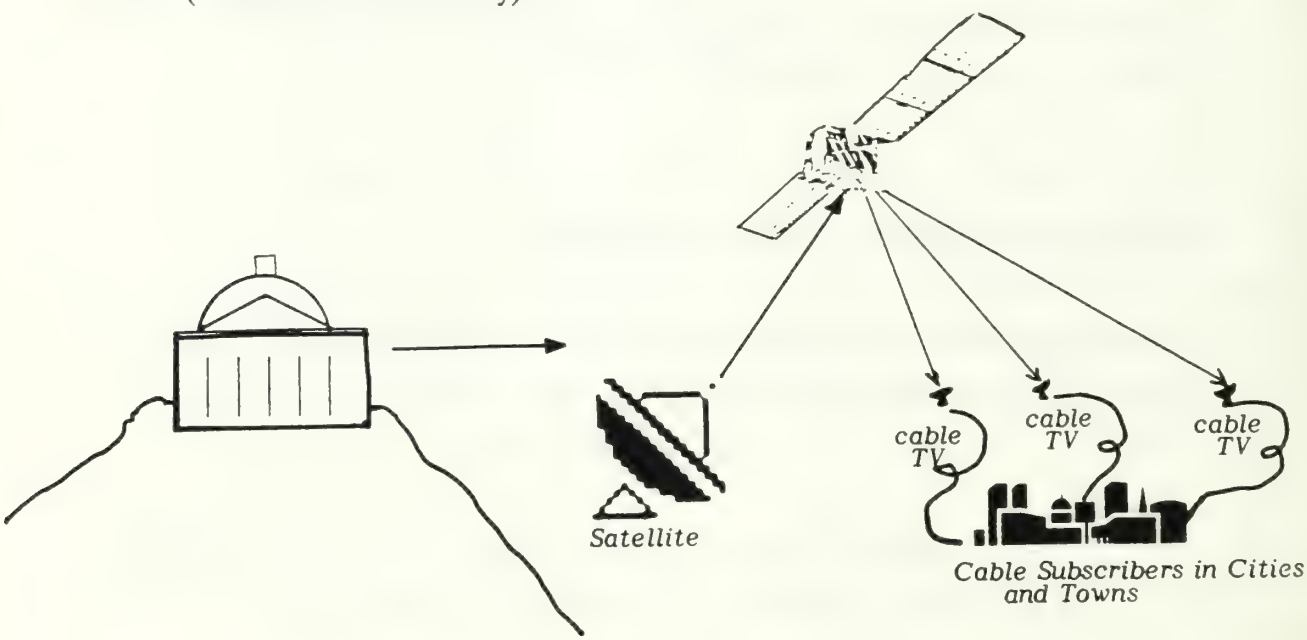
mile radius from the transmitter and repeaters. There are several ITFS frequencies in the Boston area operated by Boston Catholic Television, Northeastern University, Emerson College, and Harvard University.

- Northeastern and Boston Universities operate satellite uplinks, which are primarily used for transmitting engineering courses.

B. POINT TO MULTI-POINT: TV DISTRIBUTION SYSTEMS

Examples of point to multi-point video transmission systems include **omnidirectional** microwave like ITFS (see above), satellite networks, conventional VHF and UHF broadcast TV systems, and low power TV.

Satellite communications involves sending a signal from a transmitter, known as an earth station or uplink, to a specific transponder, or channel, on an orbiting satellite. The transponder reflects the signal back to the earth, where it can be received on a special antenna aimed directly at the satellite. This satellite antenna is known as an "earth station," "downlink," or "TVRO" (Television Receive Only).



A significant advantage of satellite communications is its ability to transmit a signal from a single point (uplink), to downlinks anywhere within a wide geographic area. For example, most domestic satellites have a national "footprint."

The use of **commercial or non-commercial broadcast TV** for Senate coverage is not considered a feasible alternative for this discussion. The Senate could not be assured of access to a broadcast channel for gavel-to-gavel coverage without great risk of pre-emption by other programming. One option might be to purchase a broadcast (VHF, UHF) licence from a local commercial or non-commercial broadcaster, but naturally this would involve great expense, and could only reach a part of the state.

The following discussion of point to multi-point alternatives, focuses on transmitting from a satellite or microwave transmitter ("point") to cable television systems throughout Massachusetts ("multi-point).

1. <u>Connecting to Cable Systems Via Satellite:</u>

a. Getting a Signal to a Space Satellite - three uplinking alternatives:

i. Constructing a Permanent State House Uplink:

The approximate cost of constructing a satellite transmitting facility (uplink) ranges from $750,000 to $1,000,000. Engineering staff would be required to operate the facility.

ii. Leasing a Mobile Uplink:

A mobile uplink is capable of transmitting from any location with a line of sight to a satellite. Typically, the cost for mobile uplinks, with crew, ranges from $2000 to $4000 per day, usually with a 1-day minimum.

iii. *Using An Existing Boston-Area Uplink:*

There are several uplink facilities in the Boston area. Various point to point transmission paths (State House to uplink) have been identified above. Generally, uplinking service ranges from $200 to $225 per hour, with variable minimums up to one-hour.

b. Getting From A Satellite to Cable Systems:

TV signals are transmitted from an uplink to a satellite transponder, which relays the signals to downlinks. This discussion focuses on reaching downlinks at cable television "headends." A cable television "headend" collects signals from many different sources and distributes them via the local cable network to subscribers.

In general, downlinks at headends are aimed at specific satellites which provide cable programming services for subscribers. A single "fixed" downlink may be capable of receiving many channels from the same satellite. For example, basic cable channels such as "The Learning Channel", "USA Network", "Lifetime", and "Arts & Entertainment" are all transmitted on different transponders of the satellite identified as "Satcom III-R."

There are three alternative ways of getting access to satellite transponders which can relay signals to cable television headends:

i. *Lease Excess Transponder Time From a Satellite Program Provider That Already Transmits to Cable Systems:*

This alternative is generally beneficial only for demonstration purposes because of the limited free time available. For example, MCET, through its Technical Assistance Program, has had a great deal of success working with the New England SportsChannel, a premium cable television service available in the majority of Massachusetts cabled towns. Because SportsChannel transmitted programming only at night and on weekends, it

was willing to let MCET use its transponder for weekday transmissions at very low cost. By leasing time on the SportsChannel, MCET has assisted Massachusetts institutions in providing teleconferences and telecourses to students and professionals throughout the state.

However, access to such a service is pre-emptable, as was demonstrated when the SportsChannel recently decided to broadcast 24 hours per day -- thus, eliminating its excess capacity.

ii. *Leasing an Unoccupied Transponder on a Satellite that Carries other Cable Services;*

This is a feasible alternative most easily explained by example: Cable headends receive programming services from satellite "X". These services occupy transponders "1","3" and "5". The Senate leases transponder "7". Thus, the satellite downlink at headends that is fixed on "X", can also receive the Senate network, requiring only minimal additional electronic equipment.

The primary disadvantage of this alternative is that the network requirements outlined in this paper demand the full-time lease of a transponder (@$1,000,000 plus, per year). That is, it is not possible to lease 1000 hours/year, on a not pre-emptable basis, especially when Senate sessions are not predictably scheduled long in advance.

iii. *Acquiring Downlinks at Cable Headends (dedicated to whatever satellite transponder is used for gavel-to-gavel coverage):*

The creation of a completely independent network is another feasible alternative. Due to advantages presented by new technologies, this alternative has the greatest flexibility. In general, most satellite

transmission is done on two types of satellites: the older, **C-band**, used by most cable television program services; and the newer, **Ku-band**, used by many educational networks.

A significant advantage of Ku-band technology is its ability to divide a single channel (transponder) into two channels, thus, providing an ability to share a transponder with another user -- i.e., two different programmers can share the cost of leasing one transponder.

2. **Connecting to Cable TV Systems via Microwave:**

There are a growing number of microwave links used to interconnect cable television systems in various parts of the state. For the most part, they have been developed by cable operators to increase the efficiency of headends, and enable a single headend to serve several communities. Other interconnects have been developed to distribute advertising, or to permit schools in different towns to share resources.

The Senate network could be developed gradually by installing point to point microwave connections to an expanding number of strategically selected headends. For example, by transmitting upstream on the Boston cable system, a program could (technically) be cablecast to Boston subscribers, and via an existing interconnect, to Brookline subscribers. It could simultaneously be transmitted to WGBH and switched on to its InterCity Relay System to WGBY in Springfield. In Springfield, the signal could be switched onto the Springfield cable television system, which is interconnected to several other systems.

A point to point microwave link from the Boston headend to Somerville, or Medford, or Cambridge headends, would serve as the link to a dozen or so other communities in the area.

Although such a network does not have the potential of statewide penetration, it is a feasible alternative. Additionally, by building from existing interconnects, it might be possible to minimize microwave tower construction costs.

C. MULTI-POINT TO MULTI-POINT: NETWORK DEVELOPMENT ISSUES RELATED TO CABLE TELEVISION

"The last mile" of transmission -- that is, the connection which actually delivers programming to homes -- is often the most complex, and most critical. For example:

- Satellite signals can reach downlinks throughout the country, but most homes are not equipped with downlinks. How then, does the satellite delivered program get transmitted into the living room?

- Broadcast television reaches only a limited radius, ranging from LPTV's ten mile radius, to the 75 mile area reached by typical VHF channels. How then can a television program originating in Boston be seen in Pittsfield?

Local cable television systems are the most pervasive means of "last mile" delivery. A cable television "headend" collects TV signals from many different sources, e.g. off-air, point-to point microwave, satellite, and distributes them to many points -- homes, schools, libraries, etc.

Below is a brief discussion of issues relating to the use of cable television for the development of the Senate network:

1. Demographics:

Approximately 75% of Massachusetts cities and towns have cable TV systems, and more than 50% of the households in Massachusetts subscribe to cable. The use of cable, therefore, meets the need to reach a majority of Massachusetts homes.

2. Types of Cable Channels:

Securing access to a television channel that reaches homes throughout the state is the most critical network development issue. To provide a perspective on this statement, it should be noted that there is no single Massachusetts-based broadcast or cable television channel that can boast of such an achievement.

There are several different kinds of subscriber channels transmitted over local cable systems:

a. Local broadcast television channels: Federal law requires that over-the-air television channels within a certain radius of a community be carried on local cable systems.

b. Distant broadcast television channels: Cable operators often carry broadcast television channels received over-the-air within a larger radius.

c. Super Stations and Basic cable services: Satellite delivered broadcast television services such as WGN (Chicago), WTNN (Atlanta), WPIX (New York) and cable programming services such as C-Span (Congressional coverage), Cable News Network, Arts and Entertainment, usually included in Basic Cable service packages.

d. Premium Services: Satellite delivered cable channels for which the subscriber pays an additional per channel fee. Examples include: HBO, Disney Channel, SportsChannel, The Movie Channel, etc.

e. Pay-Per-View Channels: Some cable systems offer subscribers the option of purchasing single movie or event (e.g., a championship boxing match, etc.).

f. Local channels: Local access channels, often programmed by community organizations and residents, (sometimes referred to as PEG channels) include Public Access; Educational Access; Governmental Access. Sometimes PEG access is provided on three (or more) separate channels, or sometimes they are combined into one. In some communities (very few) they do not exist at all.

There are three other types of local channels: Local Origination, programmed by the cable operator, often commercial; Community Programming, PEG and Local Origination combined; and, Leased Access, commercial channel(s) available to the public for a fee.

3. Channel Capacity:

The total number of channels on a cable television system may range from 12 to over 100. Generally, the older systems usually carry fewer channels than newer systems (developed after technical improvements made it possible for the same cable to carry more capacity).

The number and type of local cable channels (see II.C.2.f.) is generally determined by the agreement between the cable operator and the municipal issuing authority at the time of franchising or renewal. However, in general,

beyond local channel considerations, the cable television operator alone determines the channel line-up.

The critical network link is to gain access to a cable television channel that can deliver programs directly to cable TV subscribers in their homes. Such channels might be designated local channels (see II.C.2.f.), or unused channels on the cable system.

However, even where excess channel capacity exists, the ability to use it depends on the policies and decision of the local cable operator. Where channel capacity does not exist, it may be possible to share a PEG or Local Origination channel.

Within the next five years, approximately 30% of the Massachuseets cable franchises will expire and operators will have to go through a local license renewal process. There are two relevant factors related to process:

- Most of the smaller systems (e.g. less than 52 channels) will be upgraded as a function of the renewal process. Thus, there is a growing number of cable systems with excess channel capacity;

- Municipal issuing authorities can request, as part of the renewal process, specific program services. Although it is the operator alone who determines channel line-up, franchising and renewal processes represent the moments of greatest influence for the issuing authority.

Thus, obtaining access to cable channels is achieved through a system-by-system process. However, given the potential for meeting network requirements, and the cable television (technical) environment in Massachusetts, use of cable television for "last mile" delivery is a feasible alternative.

III. Summary of Options

This section identifies three network models that could potentially provide Massachusetts citizens with coverage of Senate proceedings and activities. Each model meets the specific network requirements previously outlined (i.e. to provide live, gavel-to-gavel coverage of the Senate that will not be pre-empted and can reach a majority of Massachusetts citizens).

The network models outlined below represent a range of technical alternatives including:

A. Total network ownership and control;
B. Incremental network development -- with limited ownership and control; and
C. Shared network ownership and control.

A. TOTAL NETWORK OWNERSHIP AND CONTROL:

Description:

In this model, the Senate would construct a permanent Ku-band uplink at the State House (see Section II.B.1.a.) and lease one Ku-band satellite transponder on a full-time, not pre-emptable basis. The Senate would acquire appropriate satellite downlinks and place one at each Massachusetts cable television headend.

The Senate would lease a local (basic) cable television channel on every Massachusetts cable system, on a full-time, not pre-emptable basis (see Section II.C.2.f.).

Advantages:

Such a network would be available 24 hours per day. When not in use, excess network capacity could be leased to commercial or non-commercial enterprises. The network would be expandable to two channels (assuming the lease of a second local cable channel on all systems).

Disadvantages:

The cost of operating such a network would be extremely high. Construction costs (uplink, downlinks) would be approximately $2 - $2.5 million. Operating costs (engineers, satellite transponder, leasing fees for local cable systems, maintenance, etc.) would be approximately $3 million annually.

B. INCREMENTAL NETWORK DEVELOPMENT -- (LIMITED OWNERSHIP AND CONTROL):

Description:

Gavel to gavel coverage of the Senate would be transmitted from the State House via an upstream cable television channel (see Section II.A. 4.), to the Boston headend, downstream to Boston subscribers and to WGBH. From each of these two locations, the signal would be transmitted via existing capacities (such as the WGBH Inter City Relay System, see Section II.A.1.), and via point to point microwave links to specific other cable television headends.

Use, or shared use of local cable television channels would be arranged on a system by system basis (see II.C.2.f.).

Advantages:

Such a network would have minimal construction and operational costs, ranging in the hundreds of thousands dollars rather than millions.

Disadvantages:

This network model would not reach all Massachusetts cable systems, and offers no potential for homes without cable service to receive the programming. (Note: A satellite based network would be accessible to any home with an appropriate satellite antenna.) Geographic barriers and the resulting increased costs associated with a terrestrial based network could limit access to the network for certain Massachusetts cities and towns.

C. SHARED NETWORK OWNERSHIP AND CONTROL:

Description:

This network model proposes that the Senate share resources with the proposed MCET network. Gavel-to-gavel Senate coverage would be transmitted from the State House via any of the alternatives discussed in section II.A.1.-4. above to a satellite uplinking facility (see section II.B.1.a.iii.). Uplink service would be bulk purchased by combining hours purchased by the Senate with those purchased by MCET on behalf of educational and other institutions participating in its proposed network.

The Senate would lease one-half of a Ku-band transponder, on a full time, not pre-emptable basis. The ability to lease one-half of a transponder would be available because MCET would lease the other half.

The MCET Network Development Plan calls for the installation of two-channel dedicated downlinks at cable television headends (see section II.B.1.b.iii). Dedicated or shared use of local cable television channels would be arranged on a system by system basis.

Advantages:

a. Public need:

This model is based on the combined use of the proposed MCET network, providing Massachusetts citizens with increased access to quality education, as well as increased access to state government.

MCET, a legislatively mandated public authority, has proposed the development of a statewide telecommunications network dedicated to educational applications. The proposed network is intended to serve the educational needs of elementary, secondary and higher education, business and industry, health care, libraries, and state and local government. It is described in detail in the plan entitled Distance Learning for the Commonwealth's Future (attached). The video portion of the network is satellite based (Ku-band), linking schools and other institutions by the placement of downlinks at individual sites, as well as at cable television headends.

b. Cost control:

In this model, the construction costs for the Senate network would be minimal, consisting primarily of the point to point system, costs for which may range from $100,000 to $300,000. Most of the remaining network construction costs would be incorporated into the construction costs of the MCET network.

c. Management of channel:

MCET would provide channel management and operation services for the network, invoking the quality control inherent in its purpose.

Disadvantages:

It is critical to the MCET network, that cable television channel capacity is available especially in densely populated areas where the placement of individual site equipment is not feasible. It is cost effective to use local cable television channels in areas where there are many schools and other institutions served by a single headend.

Combined use of a 2-channel network may place an additional burden on cable operators with limited channel capacity available.

APPENDIX 3

Chapter 305

THE COMMONWEALTH OF MASSACHUSETTS

In the Year One Thousand Nine Hundred and Eighty-eight

AN ACT FURTHER REGULATING THE CONDUCT OF CERTAIN PUBLIC OFFICIALS.

Be it enacted by the Senate and House of Representatives in General Court assembled, and by the authority of the same, as follows:

Section 3 of chapter 560 of the acts of 1982 is hereby amended by striking out the sixth paragraph and inserting in place thereof the following paragraph:-

The provisions of chapter two hundred and sixty-eight A of the General Laws shall apply to all directors, officers, advisory council members and employees of the corporation except as provided in this paragraph. Notwithstanding the provisions of sections seven and twenty-three of said chapter two hundred and sixty-eight A, the corporation may purchase from, sell to, borrow from, contract with or otherwise deal with any organization in which any director of the corporation or advisory council member is in any way interested or involved; provided, however, that such interest or involvement is disclosed in advance to the directors and recorded in the minutes of the proceedings of the corporation; and provided, further, that no director or advisory council member may participate in a decision to purchase from, sell to, borrow from, contract with, or otherwise deal with any organization with which such director or advisory council member is in any way interested or involved. Notwithstanding the provisions of sections six and twenty-three of said chapter two hundred and sixty-eight A, a director or advisory council member who is required by this act to be affiliated with a particular class of business organization, institution or association, may participate in a particular matter affecting the financial interests of the organization, institution or association with which he is affiliated; provided, however, that (*a*) said particular matter is confined to the establishment, as opposed to the operation and maintenance, of the statewide telecommunications network; (*b*) said particular matter does not affect the financial interests of said director or advisory council member, or an immediate family member or partner of said director or advisory council member; (c) the financial interest of said director's or advis-

ory council member's organization, institution or association is substantially the same as the interest of other members of the particular class of organizations, institutions or associations with which that director or advisory council member is required by this act to be affiliated; (d) said particular matter is not a decision to purchase from, sell to, borrow from, contract with, or otherwise deal with said organization, institution, or association, in which case the provisions of the second sentence of this paragraph shall apply; and (e) the interest of any said director's or advisory council member's organization, institution or association is disclosed in advance to the directors and recorded in the minutes of the proceedings of the corporation, and a copy of the disclosure forwarded to the state ethics commission. For the purposes of this paragraph, the WGBH Educational Foundation shall be deemed to belong to a class comprised of entities engaged in public educational telecommunications.

House of Representatives, November 22, 1988.

Passed to be enacted, , Speaker.

In Senate, November 22, 1988.

Passed to be enacted, , President.

November 30, 1988.

Approved,

Governor.

APPENDIX 4

MASSACHUSETTS CORPORATION FOR EDUCATIONAL TELECOMMUNICATIONS

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